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Technology

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SCAIFE COMPANY
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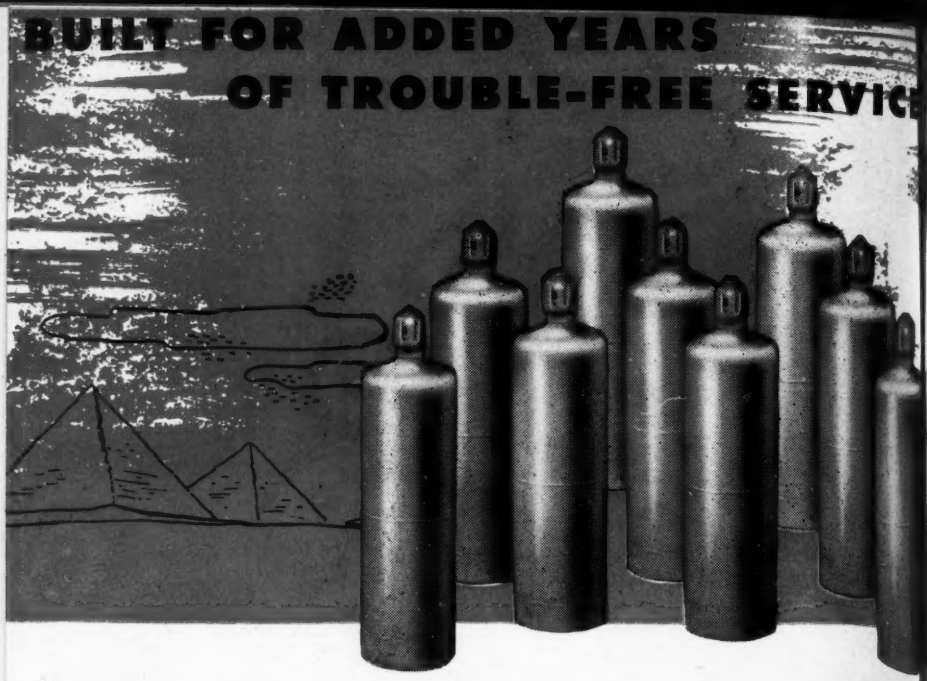
JULY, 1945



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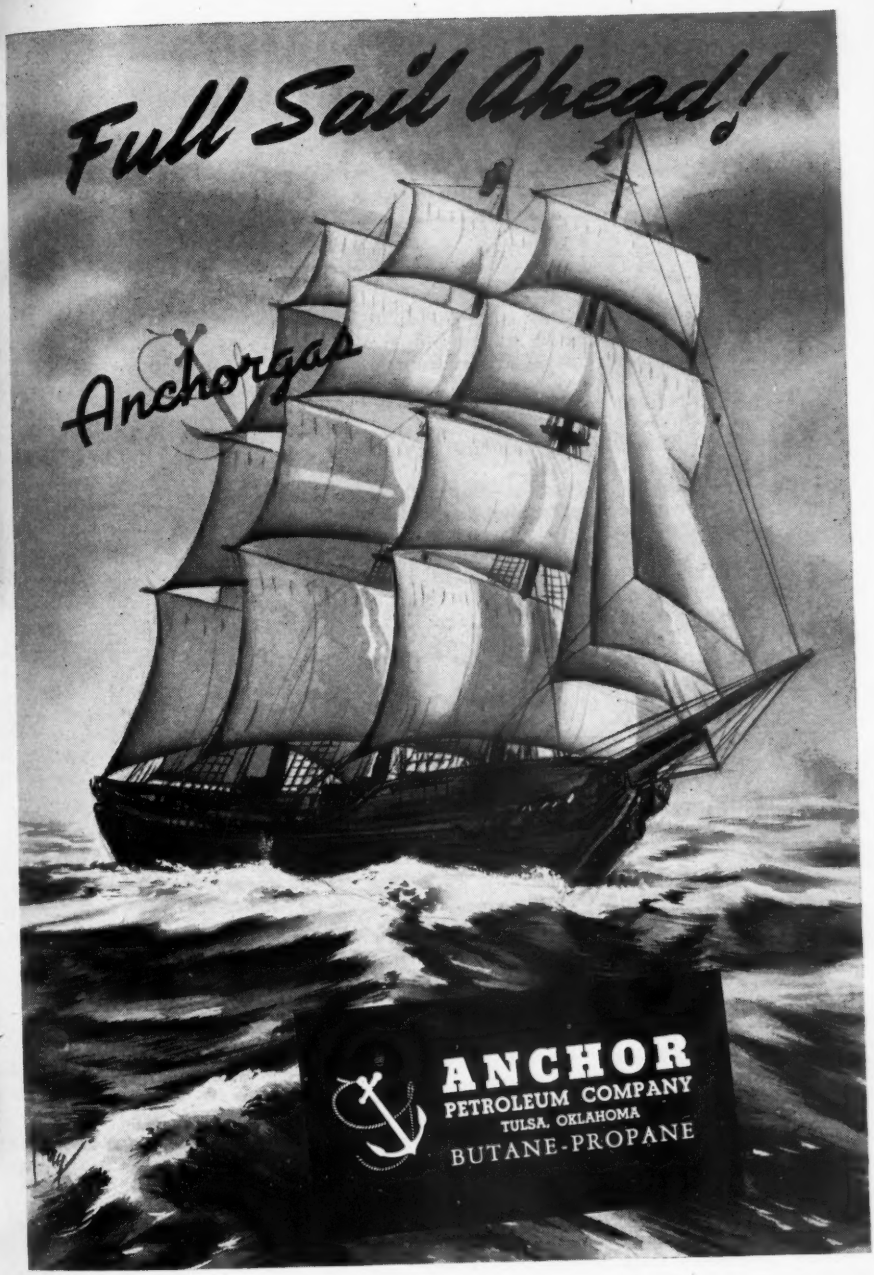

BUTANE-PROPANE *News*

Reg. U. S. Pat. Off.

Contents for July, 1945

Letters		9
Comment		13
Mainly Beyond the Mains	*By Elliott Taylor*	19
From Waste Product to Major Industry	*By W. H. Harts*	23
Safe Tank Truck Operation Is Industry's No. 1 Problem	*By Col. Geo. A. Burrell*	27
Pump Problems: Starvation—Cause, Effect and Cure	*By R. Stanley Smith*	31
New B-P Association Launches Ambitious Plans for Members	*By Elliott Taylor*	39
Commercial and Industrial Applications—Chapter 12: Background Information for Building Shoe Factory Load	*By C. C. Turner*	41
Safety: Test Exam on "NBFU 58"	*By F. F. Campbell*	46
More Tank Cars Needed to Meet 1945-1946 Demand		52
Increasing Propane Recovery in Natural Gasoline Absorption Plants	*By F. W. Bell*	56
QUIZ: Cylinder Manifolding		73
Utility Use of B-P Gas Increased 138% During War	*By F. H. Andrews*	77
Current Reading		82
What Dealers Are Thinking		86
The Trade		88
Five New Appliances Studied by Gas Association		93
Power: Truck Fleet Operates 10 Years on Butane	*By Paul Lady*	97
Classified		126
Advertisers		128

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LETTERS

• Have you service or operating problems? Submit them to us and our technical department will endeavor to help you.—Ed.

•

Gentlemen:

Would appreciate information in regard to the use and cost of butane as fuel for household heating when cost of butane is 8 cents per gallon and where coal in lump costs $10.50 per ton.

How does the use of butane compare in price to electricity for household refrigerators, with electricity at 10 cents per kwh. for the first 30 kwh.?

R. J. T.

Nebraska

By using modern appliances, 8-cent butane should compete very easily with coal at $8 per ton or less, for house heating. Butane at 8 cents per gallon is very cheap fuel and should compete with any other fuel available.

We have checked the available files of electric rates for Nebraska which indicate a low of 2.2 cents per kwh. in Burwell and Falls City to a high of 11.7 cents at Hayes Center for refrigeration rates. At the lower rate butane at around 15 cents per gallon would be competitive with electricity.—Ed.

•

Gentlemen:

In consulting your Handbook Butane-Propane Gases we have not found the comparative Btu. content of the different gases.

We are much interested in learning the Btu. content of commercial butane and commercial propane.

O. C. H.

Kansas

I do not know which edition you have of the Handbook but in the Third Edition this information can be found upon Page 22 under the heading of "Gross Heat of Combustion." In the revised Second Edition of the Handbook, the same information can be found upon Page 8.

Btu.'s per lb. vapor:	Butane:	21,338
	Propane:	21,692
Btu.'s per cu. ft.:	Butane:	3,276
	Propane:	2,526
Btu.'s per gal. of liquid at 60° F:	Butane:	103,703
	Propane:	91,757

—Ed.

•

Gentlemen:

I have a new delivery truck built for distributing propane gas. Could you give me the name of an insurance company that will write me a policy covering ten and twenty thousand public liability, $5,000 P.D., $4,000 fire and theft and $50.00 deductable collision?

W. K. M.

California

We suggest you write to D. C. Collyer, O'Rourke & Royer, Inc., Gas & Electric Bldg., Denver, Colo., or to Clarence E. Cooper & Co., c/o Liquefied Petroleum Gas Association, 11 W. 42 St., New York 18.—Ed.

•

Gentlemen:

I am considering installing either butane or propane for use in heating, hot water tank and cooking, using a 400-gallon tank for supply.

How many cubic feet of "burner gas" will a gallon of propane produce? of butane?

What is the rate of consumption for an average butane or propane kitchen range use per burner?

About what would be the rate of use for an average butane or propane

cabinet type room heater? One suitable to replace an average coal stove capable of heating 3500 cu. ft.

What is the difference in butane and propane?

What is the cost of "The Bottled Gas Manual"?

C. C.

Illinois

A gallon of commercial butane, which is a mixture of butane and propane, will produce approximately 32 cu. ft. of gas having a heating value of 3000 Btu.'s per cu. ft.

A gallon of commercial propane will produce approximately 36 cu. ft. of gas having a heating value of 2500 Btu.'s per cu. ft.

Each top burner of a kitchen range will use approximately 6000 Btu.'s per hour when on full. Ovens will use around 25,000 Btu.'s per hour. These rates will vary with the equipment purchased and can be found out from the supplier.

Room heaters will vary from 10,000 to 40,000 Btu.'s per hour capacity. From the information submitted, we roughly estimate a heater having a capacity of 20,000 to 25,000 Btu.'s per hour would be sufficient to take care of your requirements.

Butane and propane are similar products. The difference for practical purposes is the boiling point and vapor pressure. Propane boils at −44° F. and butane at +32° F. Propane requires a 250 lbs. per sq. in. storage tank. Butane mixes can be handled in containers of lower working pressure. For domestic installations in cold climates, propane is preferable.

The cost of the "Bottled Gas Manual" is $4 per copy.—Ed.

•

Gentlemen:

Would you give me some information on using propane in an automobile engine?

I recently read an article on the use of butane in airplane engines and, having a bottle of propane, I wish to use it in my automobile.

What equipment changes are necessary as to carburetor, pump, pressure used, etc.?

What is relative octane rating of propane and of butane?

Would a change in compression ratio be necessary to prevent burning valves?

W. W. M.

North Carolina

To change over it is necessary to install a pressure tank, vaporizer, carburetor and regulators and to increase the compression ratio and eliminate the heat from the gasoline manifold.

Octane rating of butane mixtures is around 95 and propane around 115.

Compression ratio can be increased to from 6½ to 7½ to 1, depending on the motor design. Increased compression ratio is necessary for economy and performance.

Advertising in BUTANE-PROPANE *News* are several firms which manufacture carburetors and changeover equipment.—Ed.

•

Gentlemen:

I am writing to you in regard to a butane installation on my car. Will you please inform me as to whom I should write to request a permit to operate a motor vehicle on butane?

This is an old installation, and I was informed that it would be necessary to have a case number to have it refilled.

I was informed that the people I had to contact were in Los Angeles, but I was unable to obtain their address.

L. R. D.

New Mexico

In April, 1944, an order was issued by the War Production Board prohibiting the use of B-P Gas (either butane or propane) on converted engines unless a permit had been obtained from the Petroleum Administration for War.

There is an office of the Petroleum Administration for War in Los Angeles but that office informs me that you are outside of its jurisdiction in New Mexico.

You will therefore have to obtain your permission from the Petroleum Administration for War in Washington, D. C.—Ed.

•

• **BUTANE-PROPANE *News* welcomes letters from our readers, but it must be understood that this magazine does not necessarily concur in opinions expressed.—Editor.**

COMMENT

TEN THOUSAND pounds of propane is the annual load required for a "small shoe factory," states C. C. Turner in his current chapter on Commercial and Industrial Applications. There are other commercial fields just as attractive, and one sale is all you have to make.

How many domestic installations must you make to equal that volume?

•

Farm income in 1944 totaled 22 billion dollars, statisticians say—up 131% since 1939.

Debts have been paid (many of them), bonds and cash are in the bank. The desire to buy needed equipment is in the heart of every forward-looking farmer. He needs tractors and trucks and pumps that run on B-P Gas. He needs gas-burning cooking ranges, water heaters, refrigerators and space heaters.

With the money to buy and the urge to possess, the farmer market should be a salesman's paradise when the factories start up again.

•

A Western utility firm, dealing exclusively in liquefied petroleum gas town plants, shows a substantial profit on its 1944 operation of central systems in 23 towns.

This is a field worth surveying. Small towns all over the land would be receptive to LP-Gas plants that would provide its citizens with all of the conveniences enjoyed in larger cities.

•

The "Old South" is "going North" on the propane idea, say those close to the trends. Shortages of butane, due to the war, and the extremely low vaporization point of propane, are good reasons for changing over.

Of course, conversion will be gradual, never 100%. High pressure vessels must be secured first, for one thing. But straight propane, or butane-propane mixtures will get away from lots of winter service problems in Southern states.

But *not* until the new propane ban is lifted!

•

Surveys show that where new hotels are needed, in all probability they will be erected as (1) highway inns, (2) airport hotels, (3) small suburban hotels.

This is right up the alley of B-P (butane-propane) Gas dealers, for most of such locations are beyond the city gas mains.

Get chummy with the architects and builders in your communities. Find out where new inns will be built and endeavor to have provisions for your fuel specified in the plans.

Watch for the remodeling of old hotels, other business houses and homes with the same objective.

•

If goods had been available in 1944, Americans would have spent approximately $120,000,000,000; neither could consumers use their 1942 and 1943 incomes as they would normally, according to government estimates.

As civilian products are gradually produced, there will be a clamoring horde to buy. No group of people need durable goods, such as ranges, water heaters, refrigerators, more than those in the fields where B-P Gas dealers are located. Get your share!

By Ed.

"ECONOMY" — —

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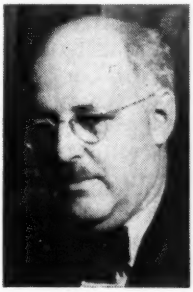
MAINLY BEYOND THE MAINS

By ELLIOTT TAYLOR, Washington Editor

The Honeymoon Is Over

While it's truth is specifically and categorically denied by the liquefied gas section of the PAW, the rumor persists that there is due shortly a relaxation of some of the restrictions that now prohibit new installations of butane and propane for domestic use. It is true that in a press release issued shortly after the surrender of Germany, the deputy petroleum administrator, Ralph K. Davies, took pains to point out that "the wartime restrictions placed on the use of liquified petroleum gases must remain in force until Japan is defeated." But the necessity for this continued restriction is open to widespread doubt.



ELLIOTT TAYLOR

The attitude of any official war agency in Washington is that to question its rulings, mandates, directives or orders is tantamount to giving aid and comfort to the enemy. For this reason opinions like the one quoted are dashed off without any attempt at a realistic explanation of the necessity for the continuation of the harsh restrictions that have been fastened on the use of liquefied gas.

The simple truth of the matter is that propane and butane operators in increasing numbers are losing their sense of duty as far as observing the limitations of PAW are concerned. And the reason they are losing that sense of duty is that they are no longer convinced that 100% restrictive measures on their fuel are essential to the war effort.

It is extremely difficult for the layman to understand why, with victory in Europe already accomplished, and with sharp cut backs in production of military goods already under way, there should not be available for increased civilian consumption at least the amount of propane that was being used as a standby and firm fuel in the plants where military output has been cut.

The spirit of accord that has prevailed between liquefied gas operators and the PAW ever since the war started has been a subject of gratification to both the industry and the government agency.

But now both sides recognize

that the spirit is wearing pretty thin, and it appears only a question of time until the PAW will be confronted with a liquefied gas industry that will be completely out of hand as far as the enforcement of order L-86 is concerned.

Industry complaints against the PAW are largely concerned with what many in the trade regard as striking examples of governmental injustice and discrimination. Small operators who have had neither the ability nor the money to present their own problems to Washington are firmly convinced that they have paid dearly for that lack, and that the sophisticated, ever-present representatives of the favored few have been able to gain concessions for their companies that have been denied the boys who stayed at home, back in the sticks.

We believe that there is no industry in the United States that is more irrevocably dedicated to complete and final victory than is the liquefied gas industry. The very fact that its members have cooperated whole heartedly with the PAW is all the more reason why the PAW should now be ready and anxious to cooperate with the industry.

If butane and propane operators have accepted in confidence the petroleum administration's statement of the necessity for the drastic curtailment of their operations, then that confidence can only be repaid by the PAW keeping ever on the alert for opportunities to relax the strictness of the curtailment whenever and wherever possible.

The PAW must recognize that it has a responsibility to industry as well as to the war effort. Its responsibility to industry is to see that no more is demanded of it than is consistent with the interests of victory, and also to keep the pledge made by Administrator Harold L. Ickes early in the war, that no industry was to be permitted to come out of the war with a competitive advantage over any other industry as a result of its war contribution.

If the rural electrification program, for example, is permitted to get a head start over liquefied gas, merely because the REA is vigorously championed in administration circles, while liquefied gas has no friends in court, then the very competitive advantage that Ickes promised would not occur will have been set up. And it will take years of the most vigorous competitive activity on the part of gas to overcome that advantage.

The PAW should be advised now, if it is not already aware of the fact, that industry opinion, once so solidly behind it, is beginning to waver. PAW has the law on its side; it has access to all of the compliance and enforcement agencies that have been created to implement its work. But the PAW knows, as we all know, that once the cooperative spirit has broken down

on the rocks of suspicion and mistrust all of the enforcement agencies at its command will be unable to achieve the results that were formerly reached by free and whole-hearted cooperation.

To remedy the situation, the PAW should first of all relax restrictions on the installation of either butane or propane or both in any areas or territories where the supply and transportation situation make such relaxation possible. In order to keep all of its operations aboveboard and out of the shadow of suspicion, that agency should also make a public accounting of all current tabulations of figures on industry operations, including the production and consumption of butane and propane for military as well as for fuel uses.

Then, as we have recommended in the past, the PAW should release every month a statement of the number of applications for new installations it has received, the number that have been granted and the names and the locations of the companies authorized to make them.

Widespread violations of L-86 may lead to disruption of the war effort, and to the ultimate discredit of the entire liquefied gas industry. Yet we are confident that such a movement can be avoided in the closing months of the war only if PAW recognizes that it has a responsibility to all companies and to all areas for the most equitable distribution and utilization of any gas that may be surplus over and above military requirements.

And if transportation is the worst problem, as we have so often been informed, then why can't the PAW assert its influence in seeing that pressure tank cars are either built or made available for butane and propane.

With our navy now practically complete, and with the great invasion fleet program nearly finished, it stands to reason that a lot of steel is going to be made available. It will go to the manufacturers of tank cars only if someone with both understanding and authority goes to the bat for the liquefied gas industry. The PAW is in the position to make its influence effective to this end where no combination or group in the industry could even get a hearing. If cooperation means to give as well as take, now is the time when PAW should be prepared to extend the kind of assistance to the industry that it and the war effort have so long been demanding.

We trust that the rumor so vigorously denied will prove to be true, and that some gas will be made available for new installations; or, failing that, we hope that some explanation of the reason for continued restrictions will be forthcoming. And we hope it will be couched in simple terms so that even we can understand it.

MASTER-METERING

Through 30 miles of mains

Broad Creek Village, developed and managed by the FPHA, will shelter more than 3000 families of Government employees or those engaged in essential war industries. Modern Gas Company, Inc. installed the LP-Gas system and provides the service.

At the Broad Creek Village housing project in Norfolk County, Virginia, domestic LP-Gas is distributed over an area of 1¼ x ¾ miles at approximately 10 lbs. per sq. in. pressure.

Accuracy of the over-all gas measurement is essential to the proper maintenance of total cost-control figures. The ability of the key meter to take care of itself without pampering is another important factor in its selection.

This master meter—housed in the control building—is the Metric-American 500-B Ironcase LP-Gas Meter, equipped with Base Pressure Index and Volume and Pressure Gage. A Reliance-American H.P.C. governor also is employed in flow control.

* * *

The several types of Metric-American Ironcase Meters, a "heavy-duty" line adapted to handling various different gases, are covered in our Catalog EG-40. Meters of all sizes and pressures.

2033

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AMERICAN METER COMPANY

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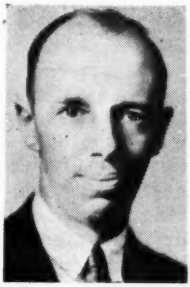
From Waste Product to Major Industry

By H. W. HARTS

Vice President, Warren Petroleum Corporation, Tulsa, Oklahoma

FOR the past many years, the various phases of oil production have gradually become more and more closely knitted.



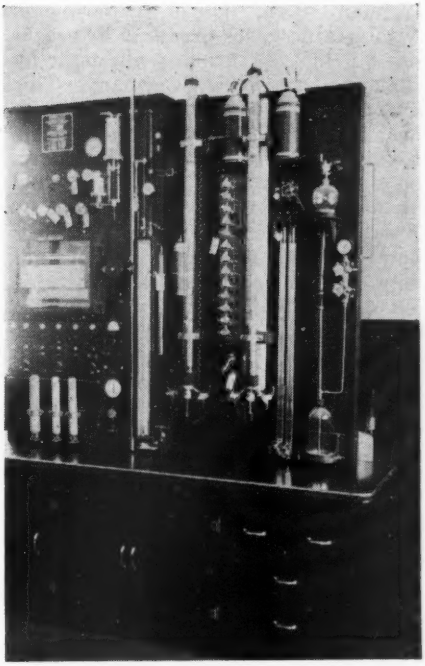
H. W. HARTS

The old days of each department acting as individual units have disappeared and now the producing, manufacturing, purchasing and various other divisions have more or less merged into one. This has been brought about by several circumstances such as government regulations, desire to conserve resources, and the necessity for higher efficiency.

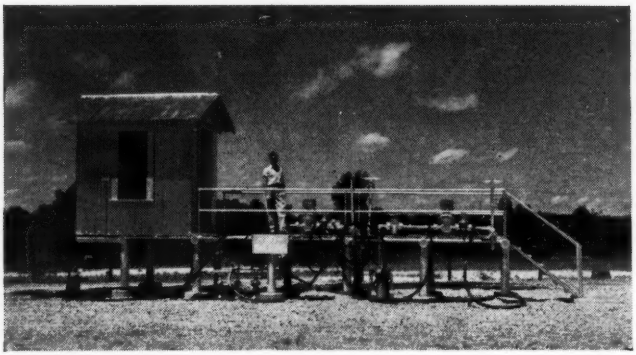
The natural gasoline and liquefied petroleum gas industry has gradually emerged from the position of a necessary evil to a recognized agency to aid in producing more oil and petroleum products at a lower cost. This has been brought about by a combination of circumstances—chief among which was the advent of cycling plants and the desire to either voluntarily or involuntarily maintain reservoir pressure through repressurizing and secondary recovery.

In a discussion of liquefied petroleum gases, it might be of interest to describe briefly some of the history of this rapidly expanding industry.

Bottled gas is not a new idea. In 1810, an Englishman in London formed a company and marketed a few cylinders, although his venture was not a success. Very little was done toward the development of the industry until 1870 when Pintsch gas



Laboratory equipment for testing purity of liquefied petroleum gas products at the Madill, Okla., plant of the Warren Petroleum Corp.



Modern truck loading dock for transport loading of butane and propane.

was developed. This product was used primarily for lighting railway cars.

About 1900, a German chemist, Herman Blau, began experiments with volatile gases produced by cracking oil. In 1907, a plant was built by Blau at Augsburg, Germany. This gas, as first produced, was a malodorous product, carrying various percentages of the different hydrocarbons from methane to gasoline and undoubtedly some hydrogen sulphide. Blau rapidly improved his product, however, and in a very few years not only had numerous branches throughout Germany, but in several foreign countries.

In addition to the original Blau plant at Augsburg, a plant was constructed at Friedrickshafen to supply gas to the Zeppelin Co. for their lighter-than-air craft. It might be of interest to note that the Graf Zeppelin was fueled with a gas having a specific gravity almost equivalent to propane.

Liquefied petroleum gas had still not found its place in industry and was forced to await the refining of a fuel that combined four minimum requirements: (1) operation at comparative low pressures, (2) chemical consistency of composition, (3) availability in large quantities, (4) low cost to consumer. These requirements were eventually satisfied by the fractionation of butane-propane gases.

The Riverside Oil Co., which operated nine gasoline plants, was the first manufacturer of liquefied petroleum gas in the United States. A. N. Kerr, the superintendent of that company, pioneered most of the development. The first report on this operation was dated Dec. 24, 1910.

Development of Appliance Line

Shortly after this, the American Gasol Co. was organized. Work then began on the equipment and appliances necessary to utilize the gas on a commercial scale. As is usually the case, the development of liquefied petroleum gas was sometimes slow and discouraging in the early days.

In 1920, the Carbide & Carbon Chemicals Corp. placed on the market a product which was called "Pyrofax" and this was the beginning of the modern era in the business. For the next 10 years, this company did much to develop the improvements so necessary for marketing these lighter hydrocarbons.

By this time, a number of oil companies were active in exploiting and developing the business and its phenominal growth is a monument to the

faith and success of these pioneers in the business.

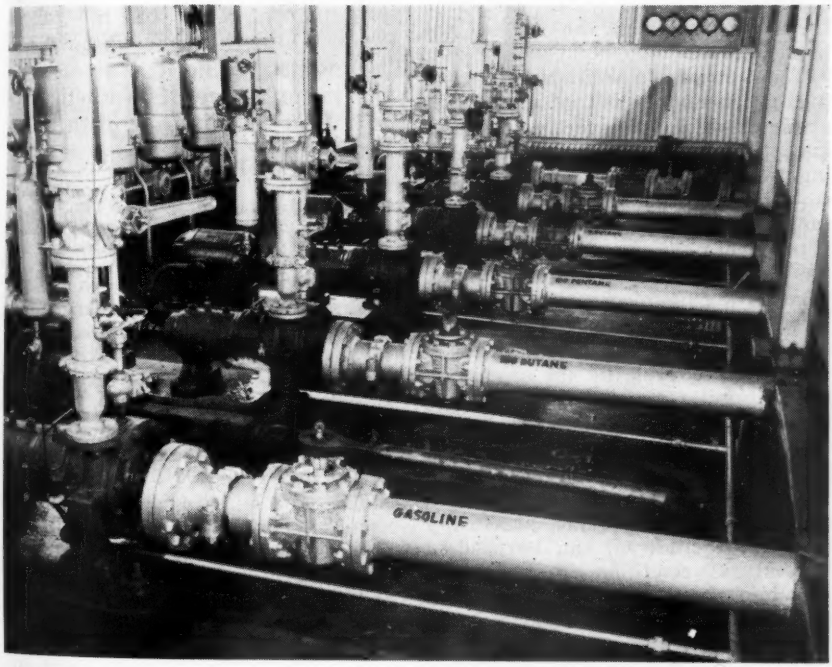
In defining liquefied petroleum gas, it might be described as being any petroleum hydrocarbon that in a free state is a gas or vapor at atmospheric conditions; namely, 14.4 pounds absolute and 60°F., but which can be liquefied by applying pressure, reducing the temperature, or both.

Gas and oil produced from a well are essentially the same from a chemical standpoint, the only difference being that oil has proportionately more carbon in ratio to the amount of hydrogen.

A large percentage of liquefied petroleum gases is produced as by-products of natural gasoline plants, although most of the modern refineries have installed recovery plants to process their waste or so-called "fixed" gases.

While the liquid gas produced at a refinery is slightly different in its chemical composition, the difference is so slight that it does not alter the usages to any appreciable extent. Where the natural gasoline plant produces a product, "propane," the refinery produces "propylene." The close relationship between these gases is such that the average domestic consumer would never know by the performance of the fuel whether he is using propane or propylene..

It is well to remember that the gasoline in your automobile is not



Loading pumps in a Warren Petroleum Corp. plant. The last pump is for butane-propane mixtures. Explosion proof motors turn over at 3600 RPM.

one particular substance, but may be composed of hundreds of different products, each varying from the other in structure and chemical ratio. These hydrocarbons vary between summer and winter and even between high and low altitudes. They consist of both low and high octane rating ingredients and the dividing and eliminating of certain of these are what make high and low octane fuel.

Octane Scale Defined

It might be well to explain the meaning of octane number. In 1926, Dr. Graham Edgar, of the Ethyl Corp., proposed this scale. He chose a fuel with very good anti-knock characteristics, iso-octane, and called it "100." He then chose a material with a very poor knock characteristic, heptane, and called it "O" and from these two materials, he created the present scale.

These two fuels are mixed in varying proportions until a mixture is attained which has exactly the same knock characteristics as the fuel being tested and the percentage of the iso-octane in the mixture is the octane rating of the fuel being tested.

In general, it may be said that in the natural state the higher, or more volatile, the hydrocarbons, the higher the octane rating; and, for this reason, the liquefied petroleum gases, which are too volatile for any great use in regular gasoline, are excellent for uses where high octane is required and the fuel can be used as a gas.

When we further realize that, with one exception, isopentane, practically no part of crude oil can be used in its natural condition in 100-octane gasoline, then it becomes apparent that, inasmuch as reforming is necessary, anyway, the higher the octane of the original material, the higher the octane of the reformed product. Thus, we see, all of the liquefied petroleum gases can be used as base materials in reforming for further manufacture into 100-octane.

The various gases considered as liquefied petroleum gases in a natural gasoline plant operation are methane, ethane, propane, isobutane and butane, although the first two mentioned are not generally considered, due to the extremely high pressure required to condense them to a liquid. These two gases comprise the major part of the natural gas burned in your home.

Within the experience of most of us in the oil business, all three of these products were largely wasted and considered of no value. Last year, 785 million gallons of liquid gases were sold as such. Approximately two billion gallons went into 100-octane gasoline and 200 million gallons were used in the manufacture of synthetic rubber. That is quite a growth in approximately 15 years.

New Research Bulletin Explores Oven Heat Distribution

A comprehensive research bulletin dealing with problems in range oven heat distribution has been completed by the American Gas Association Testing Laboratories for approval by the Committee on Domestic Gas Research. It forms the tenth of a series devoted to domestic gas cooking research.

The new bulletin charts predominating effects on oven heat distribution observed in different ranges examined due to such constructional changes as variations in location of oven burner, size and location of oven bottom openings, area and location of flue outlets, changes in oven bottom insulation, and location of the thermostat bulb.

Safe Tank Truck Operation Is Industry's No. 1 Problem

By COL. GEORGE A. BURRELL

President, Atlantic States Gas Company, Inc., New York City

COL. G. A. BURRELL

THESE recommendations for tank truck operation have been submitted to the committee of the Liquefied Petroleum Gas Association, headed by M. G. Farrar, "Pyrofax" Division, Carbide and Carbon Chemicals Corp., for inclusion in the committee's suggestions for the revision of NBFU Pamphlet No. 58, which is now in preparation.

Colonel Burrell wishes to acknowledge helpful cooperation in the preparation of this article by Floyd Campbell, Phillips Petroleum Co.; E. B. Hart, Shell Oil Co., Inc.; A. N. Kerr, Imperial Gas Co., and F. A. Coulter, J. E. Shaffer and J. E. Taylor, of his own organization.—Editor.

We began a series of articles last month month we will publish the third in the series by Mr. Smith.—Editor.

Filling Tank Trucks

Examine the truck carefully before starting out to see that it is in good condition, and carefully examine all connections for leaks. Similar examinations should also be made at every stop.

In filling a tank truck first see that the brakes on the truck are firmly set and that the wheels are blocked. Make sure that the hose is in good condition.

Shut off the truck motor before filling the truck.

Open all valves between the pump and the tank truck before starting the pump.

Stay near the truck while filling.

As soon as the truck is loaded be sure that all hose connections are disconnected immediately, and notify the other driver, if two drivers are present, when all connections are broken. Be sure that there is close team-work between drivers and that one will not start the truck without the full knowledge of the other, and that each is aware of everything the other has done, or has not done.

Do not place the hose inside a closed compartment on the truck, because if the valve should leak at the end of the hose, gas will accumulate in the compartment and may be set on fire.

After the tank is filled and the pump shut off, close the valves on the bulk tank, at the pump, on the truck, and then the one at the end of the hose. Then disconnect the hose. Always remember that the hose is filled with gas under pressure, and may leak.

General Filling Instructions

Make certain that all containers are designed to hold the gas placed in them. Operators will also satisfy

themselves that the container has been retested as required by regulations, and that the required data is either stamped into the shell head, or is on a nameplate attached to the container.

Always purge new or retested cylinders of air.

Before filling a tank, take careful note of all surroundings, as regards fires that may be within range of a possible gas-air mixture.

Carefully examine the truck for any leaks.

See that there is no loitering of persons, especially children, in the immediate vicinity of the filling operation.

Do not leave the delivery truck unattended during the filling operation.

Always block the wheels of the truck preliminary to a filling operation.

Do not stretch the hose to a point where the tank can barely be reached. Doing this puts a strain on the connections.

See that all valves are open between the pump and the tank before starting the pump.

Always pick up the valve end of the hose. Do not scrape the hose along the ground any more than is absolutely necessary.

When the filling operation is completed see that the hose is firmly coiled and packed in its place.

Again examine the truck for leaks.

"Out-of-gas" containers shall be refilled only after making certain

Filling underground consumer tank from delivery truck.

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Rear view of Atlantic States Gas Co.'s tank truck.

that all appliances, including the pilot light, are turned off. If the customer is away from home, no refills shall be made.

Filling Consumers' Underground Tanks

Examine the truck for leaks.

If a slip tube gage is used, keep head away from the curb box when taking off the slip tube cap and when gaging the tank. The slip tube can fly up with great force, due to the pressure in the tank.

Check the packing nut on the slip tube, but do not pull it too tightly.

Check the washer in the filler valve and in the slip tube cap. Replace any that are worn or do not sit properly in place.

See that the check valve seats properly in the filler valve seat.

When replacing the filler valve cap, be certain that it is tight; also, the slip tube cap.

Check the vent on the high pressure regulator for a leak, and all other places where it might occur.

Report broken curb boxes and cases where the ground has settled so as to expose the curb box.

Be sure to seal the curb box when the filling operation is completed.

Finally, again closely examine the truck for any leaks.

Safe Driving Rules for Tank Trucks

Before going on the highways, inspect:

a. For leaks.
b. Brakes.
c. Reflectors.
d. Rear view mirrors.
e. Horn.
f. Lights and electric wiring.
g. Wheel and rim lugs.
h. Tire inflation.
i. Steering mechanism.
j. Flares.
k. Setting of governor.

Inspect the truck for leaks every time you stop.

Block the wheels whenever you stop and do not stop on a grade if this can be avoided. If this is necessary, turn wheel to curb, apply hand brake and set gears in low or reverse.

Do not smoke in or near the tank truck.

Maintain a safe driving area in front, back, and on both sides of your vehicle. At 40 miles per hour you should allow 150 ft. between vehicles.

Keep tires inflated at proper pressure and change them around as needed.

Forget who has the legal right of way. The other fellow may cross you up.

Adjust the driving speed to conditions of the road surface, general traffic conditions, and visibility.

Do not depend entirely upon the rear vision mirror in handling a tank truck. Get out and walk back of, or around the truck, to make certain that nothing is in the way, or will be in the way. Then act promptly.

Never back up at an intersection in order to turn around.

When backing over a sidewalk and into a street, stop at the sidewalk to make certain that nobody is close by. Stop again at the curb to check street traffic.

Do not pass a vehicle unless there is proper clearance ahead of you. Never pass on a curve, or at an intersection.

Never cross a white line in the center of the road.

Stop when vehicles ahead of you are unloading passengers. Stop at all railroad crossings.

Do not stop on travel portion of the highway.

Avoid sudden brake applications.

Keep cab ventilated.

Do not park a truck which has gas in it in a garage, or do repair work on truck that contains gas.

Controls Will Remain On Plumbing Equipment

To maintain an even flow of plumbing, heating and cooking equipment, retention of the order governing distribution of this equipment (L-79) was recommended by members of the Plumbing and Heating Distributors Industry Advisory Committee at their recent meeting, WPB has announced.

The recommendation was accepted by WPB.

U. S. Coast Guard Revises Tank Vessel Regulations

A revised edition of the "Tank Vessel Regulations" (46 CFR 30-35, 37, 38) containing amendments which have been published in the Federal Register, is being printed and may be obtained from the Commandant (AOS), U. S. Coast Guard, Washington, D. C., or from offices of District Coast Guard Offices and Officers in Charge, Marine Inspection.

PUMP PROBLEMS

Starvation—Cause, Effect and Cure

By R. STANLEY SMITH

Manager, Smith Precision Products Co., South Pasadena, Calif.

PROBLEMS involved in liquid transfer are rated among the most important confronting operators throughout the country today. Much technical and engineering information is required to properly install a pumping system and keep it efficiently at work.

We began a series of articles last month which will enable pump users to better understand and correct difficulties which may arise in the field.

R. Stanley Smith, manager of Smith Precision Products Co., South Pasadena, Calif., manufacturers of Smith butane-propane pumps, reveals in the accompanying Questions and Answers ways to avoid some of these difficulties in pumping butane and propane. Next month we will publish the third in the series by Mr. Smith.—Editor.

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What is meant by "pump starvation"?

When the intake of liquid to a pump is less than the capacity of the pump to discharge, this condition is frequently referred to as "pump starvation."

What is the cause of pump starvation?

It is caused by any of a number of conditions which restrict the flow of liquid to the pump, such as an inadequate size of the inlet piping, or an insufficient head pressure to force the liquid through the inlet piping, and its necessary fittings, to the pump.

Would not pump suction be effective in drawing liquid in sufficient quantity to fill the pump capacity regardless of some restriction in the inlet line?

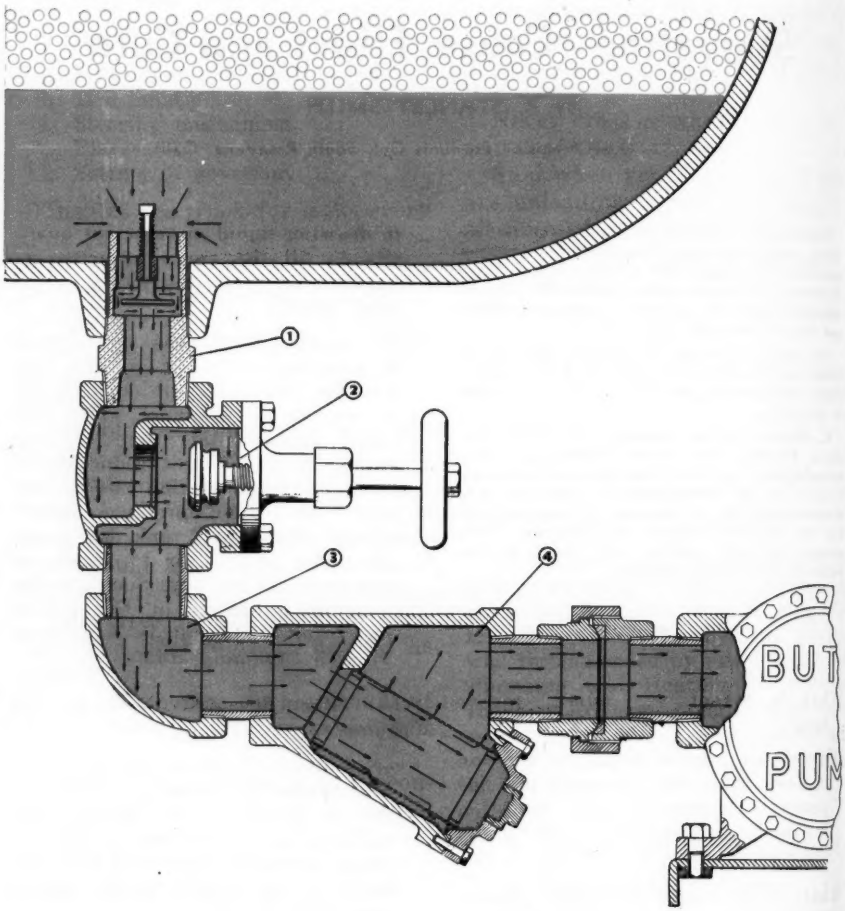
Pump suction is effective to a degree in pumping water or oil, but this does not work out with such liquids as butane or propane, which are being handled at their boiling points. Even a slight reduction of pressure in the suction line to less than the vapor pressure established in the supply tank, will cause the liquid to boil or to "open up into gas," as we say. Such suction pressure reduction in the intake line results in what is sometimes called a "foaming intake."

What effect does this have on the pump capacity?

Every bubble of gas at the pump intake naturally displaces a like volume of liquid. If the intake were half gas in volume, we would discharge approximately half as much liquid as we would if the intake were solid liquid.

What is the best way to avoid this capacity reduction?

In the first place, since it is often impossible to avoid a considerable resistance to fluid flow in the intake line, it is most important to provide as much height of the tank liquid level above the pump intake as may be practicable.



This drawing shows a pump intake assembly made up of (1) 3-in. excess flow valve; (2) 3-in. globe valve; (3) 3-in. elbow, and (4) 3-in. strainer, all of standard makes. It is worthy of note that the restricted flow area in the excess flow valve, just below the valve seat, is less than one-half the area of the 3-in. pipe, and that the excess flow valve as well as the globe valve become a serious flow impediment due to the numerous changes in fluid flow direction. The various units shown are drawn to scale.

It is difficult to see why the addition of a few feet of height of the liquid level above the pump would help much when the liquid is already under a vapor pressure of 50 to 150 lbs. in the tank. Doesn't this tank pressure help to force the liquid into the pump?

Suppose you are handling 100% propane at a tank temperature of say 80° Fahrenheit, your tank gage will register 128 lbs. This figure you can find on your temperature-pressure charts, and this is the pressure at which the liquid will stop boiling at that particular temperature. If, under these conditions you were to draw off a little gas, enough even to drop the pressure just 1 lb., or to 127 lbs. on your tank gage, the liquid in the tank would at once start to boil and to give off additional gas or vapor so as to bring the pressure on your gage right back to the 128 lbs. This, of course, is assuming that the temperature remained constant. Now, for the same reason, if the pressure in the intake line is reduced 1 lb., or more likely several pounds, in drawing the liquid to the pump by suction, the same boiling of the fluid results, only this time the bubbles are formed in the suction line instead of in the tank.

How does the height of liquid level above the pump stop this trouble?

If the liquid level is higher, say by several feet, than the pump intake, then the pressure at the pump will be just that much greater than the registered pressure in the tank. This added pressure amounts roughly to 1 lb. for every 4 ft. of liquid height for butane or propane, so that if the liquid level were 4 ft. above the pump intake and our gage registered 128 lbs. in the tank, the pressure at the pump would be 129 lbs. This 1 lb. of pressure is then available to force the liquid into the pump without drawing the pressure down to where the liquid will boil at the pump intake, or "open up into gas."

Supposing it is difficult or impossible to provide for much height of liquid above the pump intake, what else can be done to prevent boiling in the intake line?

After arranging for all possible head pressure, be very careful to keep the intake lines as large and as short and direct as you can, and pay particular attention to having the fewest possible changes of direction of flow as can be arranged.

Is it more important to have large and direct lines to a pump mounted on a tank truck?

Only because on a tank truck it seems quite difficult to provide for much inlet head. In other words, it is not practical on a tank truck to raise the tank much above the truck frame because of the importance of keeping a low center of gravity, and so avoid a top-heavy load. On the other hand, the pump cannot be mounted too low on account of road clearance. Therefore it is seldom possible to have the pump intake more than a foot, or perhaps two feet at the most, below the tank bottom.

How then can an adequate flow of liquid be insured?

Only by careful attention to the piping problem as suggested above, so as to assure the least possible intake resistance.

How can intake pipe resistance be lessened?

First by having large size pipe and

PIPE SIZE IN STANDARD OR EXTRA STRONG WALL THICKNESS		INTERNAL OR FLOW AREA OF PIPE IN SQ. INS.	FIRST COLUMN SHOWS FLOW VELOCITY IN FEET PER SEC. THROUGH PIPE TO DELIVER GALLONS PER MIN. REQUIRED. SECOND COLUMN SHOWS THEORETICAL HEAD IN INCHES USED IN ACCELERATION OF LIQUID TO VELOCITIES SHOWN.																	
			10 GPM		20 GPM		30 GPM		40 GPM		50 GPM		60 GPM		70 GPM		80 GPM		90 GPM		100 GPM	
			VEL.	HEAD	VEL.	HEAD	VEL.	HEAD	VEL.	HEAD	VEL.	HEAD	VEL.	HEAD	VEL.	HEAD	VEL.	HEAD	VEL.	HEAD	VEL.	HEAD
1"	EX. STR.	.72	4.4	3.7	8.9	14.9	13.4	33.6														
	STANDARD	.86	3.7	2.6	7.5	10.6	11.2	23.6														
1¼"	EX. STR.	1.28	2.5	1.2	5.0	4.7	7.5	10.6	10.0	19.0	12.5	29.0										
	STANDARD	1.50	2.1	0.9	4.3	3.5	6.4	7.7	8.5	13.6	10.7	21.6										
1½"	EX. STR.	1.77	1.8	0.6	3.6	2.5	5.4	5.5	7.2	9.7	9.0	15.2	10.9	22.0	12.6	30.0						
	STANDARD	2.04	1.6	0.5	3.2	1.9	4.7	4.2	6.3	7.4	7.9	11.8	9.4	16.6	11.0	23.0	12.6	30.0				
2"	EX. STR.	2.95			2.2	.9	3.3	2.1	4.3	3.5	5.4	5.5	6.5	8.0	7.6	10.8	8.7	14.2	9.8	18.0	10.9	22.0
	STANDARD	3.36			1.9	0.7	2.9	1.6	3.9	2.9	4.8	4.4	5.8	6.4	6.8	8.5	7.8	11.4	8.7	14.0	9.7	17.6
2½"	EX. STR.	4.24			1.5	0.4	2.3	1.0	3.0	1.7	3.8	2.7	4.5	3.8	5.3	5.3	6.0	6.8	6.8	8.6	7.5	10.6
	STANDARD	4.79			1.3	0.3	2.0	0.7	2.7	1.4	3.3	2.0	4.0	3.0	4.7	4.2	5.3	5.4	6.0	6.8	6.7	8.5
3"	EX. STR.	6.61					1.4	0.4	2.0	0.7	2.4	1.2	2.9	1.6	3.4	2.2	3.9	2.9	4.4	3.7	4.8	4.4
	STANDARD	7.39					1.3	0.3	1.7	0.6	2.2	0.9	2.6	1.3	3.0	1.7	3.5	2.3	3.9	2.9	4.3	3.5
4"	EX. STR.	11.50							1.1	0.2	1.4	0.4	1.7	0.6	2.0	0.7	2.2	1.0	2.5	1.2	2.8	1.5
	STANDARD	12.73							1.0	0.2	1.3	0.4	1.6	0.5	1.8	0.7	2.0	0.8	2.4	1.0	2.6	1.3

TABLE 1

fittings, and second by selecting valves and other fittings of the type which will insure the fewest possible changes in the direction of the flow stream. Avoid, where possible, all fittings with flow areas which are restricted to less than the full pipe area.

What size pipe should be used?

It would be a very good rule if the inlet lines for every butane and propane pumping installation could be kept large enough so the flow velocity through the pipe and fittings never exceeded a rate of 4 to 5 ft. per second.

What size piping would it take to carry out this rule, say on an installation handling 50 gals. per minute?

Table I has been prepared to show at what velocity in feet per second liquid must flow in various size pipes to carry a certain number of gallons per minute discharge. From this table, we see that were we to adopt a 2-in. standard strength pipe for capacity of 50 gals. per minute, we would have a flow velocity of 4.8 ft. per second, but if we used extra strong pipe, which is usually required as a safety measure, this would raise the flow velocity to 5.4 ft. per second. The table also shows that if we could provide 2½-in. piping, the velocity would go down to 3.8 ft. per second, even if extra strength pipe were used.

Just why is a velocity of 4 ft. per second so much better than 5 or 6 or even 8 ft. per second, which is often considered satisfactory for water or even gasoline?

The figures shown in Table I in the columns marked "Head," opposite the velocity rates, show the amount of head energy which is consumed to accelerate the fluid to the necessary velocity. The figures are based on the theoretical acceleration. Actual discharge rates under varying conditions may be considerably less than these figures would indicate, depending principally on the shape of the passages involved. However, this table will help to a better understanding of the problem, and gives a good indication of the comparative amount of energy in inches of head pressure which will be used up in accelerating liquid in the pipe and fittings to the various required velocities, in feet per second. From these figures, we see that to initially accelerate a liquid to a velocity of 5.4 ft. per second for the delivery of 50 GPM through 2-in extra strong pipe, will take 5½-in. of head energy. However, to deliver twice as much liquid, or 100 GPM, through this same pipe, the velocity would be doubled. According to our table, to deliver 100 GPM through 2-in. extra strong pipe, the velocity would be 10.9 ft. per second, and the liquid head consumed would be 22 in. instead of 5½ in., or four times as much. On the other hand, we could double the through-put volume by changing the flow area to twice its size. In other words, a 3-in. pipe would more than double the flow and would do this with less than the original 5½ in. of head.

Is this the reason that larger pipes are important when there is a limited height of liquid?

Yes, this is it, but if the liquid only had to be accelerated once, the size of piping and the flow areas of fittings would not be of nearly so much importance. As a matter of fact, this liquid has to be acceler-

ated not once, but usually many times, before it gets from the tank to the pump.

Why is this?

Suppose we assume it takes 3 in. of head energy to start liquid flowing from our tank into a 2-in pipe at 4 ft. per second. Just as soon as this liquid hits a 90° elbow, practically all this flow velocity energy is lost.

Why is this?

Because the liquid does not glide smoothly around an ordinary 90° pipe elbow, as one might think. Liquid, like any other matter, does not readily change its direction of motion. In fact it is found by tests, that practically 100% of the energy originally acquired by the liquid has been lost in passing around a standard 90° elbow, and a new 3 inches of head must be allowed to again accelerate the fluid in the new direction.

Does a 45° elbow cause the same resistance?

No, we usually allow about one-half of this loss for a 45° degree elbow.

Does a globe valve cause as much resistance as a 90° elbow?

Yes, here is where we begin to get into real trouble. In fact, it is found by actual test, that a globe valve of the usual standard type, may cause not just as much, but even 10 times as much flow resistance as a 90° elbow of the same designated pipe size.

Why is this?

It is only necessary to examine the flow path through any globe valve to see that several complete changes of flow direction occur in the passage of the fluid. Each of these changes of flow direction can be figured to add an extra 3 in. of head energy or more, to maintain the flow capacity.

Why do you say more?

Because the flow areas through a standard globe valve are often reduced as much as to half of the normal pipe cross sectional area. So with each turn in direction, and with the flow area reduced to half, we would have lost an acceleration force equal to 8 ft. per second instead of 4 ft. This 8 ft. per second velocity would, according to our table, then absorb 12 in. of our head energy instead of 3 in. It is for this reason that a globe valve does actually cause as much as 10 times the resistance of a 90° elbow, and so plays havoc with any attempt to get by with our limited head pressure and still deliver solid liquid to the butane pump.

What can be done about this?

The substitution of gate valves or plug valves when possible in the service, is the best answer. These valves, by permitting straight through flow, eliminate practically all these resistance losses except perhaps for some flow area reduction in certain types of plug valves.

Why are not plug or gate valves more generally used?

Probably because they are often quite troublesome to keep tight. Aside from this, their use is very much to be advised.

Does an excess flow valve offer a serious flow impediment?

Yes, the standard type of excess flow valve causes about the same, if not a greater, impediment than the globe valve and can readily

consume many feet of head energy in passing their rated capacity.

What can be advised to overcome this difficulty?

Since the resistance which these valves cause is dependent on the velocity of flow through restricted areas, as well as to numerous changes of flow direction, the best remedy is to install as large an excess flow valve as may be permitted. As previously stated, doubling the flow area will theoretically reduce to one-fourth, the amount of head energy lost for each change of direction.

Assuming that with all due care in

AMOUNT OF REDUCTION OF PRESSURE AT PUMP INLET BELOW PRESSURE IN TANK	REDUCTION IN POUNDS	¼#	½#	¾#	1#	1¼#	1½#	1¾#	2#	2¼#	2½#	2¾#	3#
	REDUCTION HEAD IN FT.	1'	2'	3'	4'	5'	6'	7'	8'	9'	10'	11'	12'
PROPANE AT TEMP. OF	110°F.	.5	1.2	1.9	2.6	3.3	4.0	4.6	5.2	5.7	6.2	6.7	7.2
	70°F.	1.8	3.2	4.5	5.8	7.1	8.4	9.6	10.8	12.0	13.1	14.2	15.2
	30°F.	4.0	8.0	11.0	14.0	17.0	2.0	22.5	25.0	27.0	29.0	31.0	33.0
ISOBUTANE AT TEMP. OF	110°F.	4.0	7.5	11.0	14.5	17.5	20.5	23.0	25.5	28.0	30.0	32.0	34.0
	70°F.	8.5	16.0	23.0	29.0	34.0	38.0	42.0	45.5	48.5	51.0	53.0	55.0
	30°F.	19.0	34.0	46.0	55.0	60.0	64.0	67.5	70.5	73.0	75.0	77.0	78.5
N-BUTANE AT TEMP. OF	110°F.	6.0	11.0	15.5	19.5	23.0	26.0	29.0	32.0	34.5	37.0	39.5	42.0
	70°F.	12.0	23.0	33.0	41.5	47.0	52.0	56.0	59.0	62.0	64.5	67.0	69.0
	30°F.	30.0	46.0	56.0	62.5	67.0	70.5	74.0	77.0	79.0	80.5	82.0	83.0

Table 2. The table above shows the approximate pump loss in per cent of delivery capacity which may be expected when the pressure in the inlet line at the pump is reduced by suction to below the pressure registered in the supply tank. This loss will be in accordance with the volume of vapor which may be formed and which displaces an equal volume of liquid.

These figures emphasize the advantage to be derived from providing a fluid level in the storage tank as high above the pump inlet as possible, or when this cannot be done, the importance of having a large size inlet line with oversize pipe fittings and the fewest possible changes in direction of flow, as explained in this article.

EXAMPLE—If propane is to be pumped at 70° F. under a suction pressure reduction at the pump intake of 3 lbs. below the tank vapor pressure, what loss in pump capacity may be anticipated?

ANSWER—In the table under propane at 70° F., find the figure in the column for 3 lb. reduction, which is 15.2. This indicates a loss of 15.2% in pump output capacity. Other factors may add to this loss but for the single item of a starved suction line, a pump of 50 GPM capacity would be reduced by 15%, or to 42.5 GPM discharge.

eliminating flow bends and restricted areas, it becomes quite impossible to expect the delivery of the required flow to the pump by gravity alone, what loss in output may be expected under such conditions?

This reduction in capacity can be quite definitely computed but will depend upon the type of fluid handled, the temperature at which it is being pumped, and the pounds or feet of suction pressure reduction which becomes necessary to supply the pump capacity.

Is there any simple way to determine this loss?

Table II is intended to give an approximate indication of the pump capacity which will be lost through the suction pressure reduction necessary to draw the liquid to the pump. This subject will be covered in greater detail in a later article when we will provide more data on which to compute these losses.

Since avoidance of pump starvation seems to be so very important in effecting full pump delivery, how can we summarize the principal items to which close attention should be given in a butane or propane pump installation?

1. Provide inlet piping and fittings of large cross-sectional area.
2. Avoid all sharp bends in the piping layout.
3. Select all valves and fittings with a view to straight through flow where possible. Otherwise, oversize valves and fittings are to be advised.
4. Provide for as much gravity head as can be arranged, by raising the tank and lowering the pump to keep the liquid level as high as practical above the pump intake.

Most of the suggestions above have related to the pump inlet line. Should the outlet line also be planned in the same way for free flow capacity?

It seems very important to use a great deal of care in getting butane or propane into the pump. This is due to the unstable condition of this type of fluid which must be handled at its boiling point. However, when solid liquid, free from gas bubbles, can be delivered to the pump, it usually is not difficult with a good pump to develop any reasonable necessary outlet pressure to care for ordinary pipe resistance, or to force the liquid against the usual vapor pressure differentials encountered.

Are not many butane and propane pumps operating successfully where the piping problem has not been too carefully worked out?

Yes, thousands of pumps are installed apparently without too much consideration for their most successful performance. Their operation is usually entirely satisfactory where maximum delivery is not too important. However, when the principles involved are better understood, pumps can be installed to operate with far greater efficiency, to last longer, and to give generally more satisfactory service.

• In every original pump installation there are usually included some good and some bad features. Mr. Smith has had many opportunities to observe these and in next month's issue he will attempt to analyze such features—good and bad—in an effort to assist operators in securing the best possible results in their future installations.—Editor.

New B-P Association Launches Ambitious Plans for Members

E. E. HADLICK

H. H. TORBIT

By ELLIOTT TAYLOR

In the first official meeting of its board of directors, the newly organized National Butane-Propane Association (the new name for the American Butane-Propane Distributors Association) cleared the decks of all organizational requirements preliminary to the launching of a national membership drive that its sponsors anticipate will be carried into every state of the union.

Meeting in the Stevens Hotel, Chicago, June 20, the board proceeded to ratify its new by-laws, define the classifications of membership and set up the schedules of dues that will prevail. Permanent officers for the first year were elected to take the place of the temporary slate that had formed the group of original incorporators.

The 1945 officers now include: Elwin E. Hadlick, Minneapolis, Minn., president; W. T. Joplin, Phoenix, Ariz., 1st vice president; Peter A. Anderson, Portland, Maine, 2nd vice president; W. E. Fraley, Abilene, Texas, secretary, and Harry H. Torbit, Pueblo, Colo., treasurer. District vice presidents in addition to Mr. Joplin and Mr. Anderson, include: C. M. Ambrose, Seattle, Wash.; F. N. Mabee, Denver, Colo.; V. W. Packard, Patosky, Mich.; T. A. Sacra, Roswell, N. M., and Hermann Paris, Sandersville, Georgia.

The board of directors was expanded to twenty-five, in addition to the above officers, new members being: H. C. Tenbrook, Kokomo, Ind.; George F. Eiker, Sparta, Ill., and Byron Thornton, Las Vegas, Nevada. Other members are as published in the June issue of BUTANE-PROPANE *News*, Page 34.

Member Qualifications

Those eligible to become active members have been officially defined as: "persons, firms, corporations who operate bulk storage facilities of a tank car or more capacity whose business is the sale of liquefied petroluem gas directly to ultimate consumers through regularly established dealers in less than

tank car load or truck transport lots."

Associate membership is open to manufacturers or suppliers of gas appliances and equipment, and provisions have also been made for honorary members and for association memberships.

Minimum Dues, $150

The schedule of dues for both active and associate members is based on the dollar volume of gross business in sales and service of liquefied petroleum gas, appliances and equipment in the butane and propane field. A member having under $75,000 a year in gross sales shall pay $150 dues; one doing from $75,000 to $200,000 shall pay $400; $200,000 to $500,000 shall pay $700; $500,000 to $1,000,000 shall pay $1,200, and companies doing over a million dollars a year in the field will pay dues of $2,400 per year. Regardless of the amount of dues paid, voting will be by active members only, and each member will have but one vote.

The work of carrying on the organizational drive is in the hands of president Elwin E. Hadlick, of Minneapolis, who is not a liquefied gas operator, but an attorney who has devoted most of his life to organization matters in the petroleum industry. He serves the new association on a paid basis, assuming the responsibilities and duties that are often carried by an executive secretary or managing director.

Tentative locations for forthcoming organization meetings include Denver, or Omaha; Atlanta, Ga., or Charleston, S. C.; Los Angeles; San Francisco; Portland, Ore.; Dallas and Lubbock, Texas; Boston and New York City.

Two activities which the directors regard as being of paramount importance at the present time, and which will be the subject of immediate action by the association are those of industry representation in Washington, D. C., and the raising of the technical and safety standards of bulk station operations.

Scores of enthusiastic letters and signed support cards from operators and suppliers located across the entire nation were exhibited to the directors by John L. Locke, of Minneapolis, who assisted in the formation of the association, and he expressed his opinion that the returns indicated every reason for optimism on the part of the newly elected officers and directors of the National Butane-Propane Association.

Government Loans Available To Small Manufacturers

Hundreds of small manufacturers, making thousands of essential civilian products, will now be able to obtain loans from the Smaller War Plants Corporation under new policies adopted by the corporation, Maury Maverick, chairman and general manager, announced May 28.

Mr. Maverick pointed out that Public Law 603, which created SWPC, empowered the agency to make loans "to enable small business concerns to finance the acquisition of equipment, facilities, machinery, supplies or materials, or to supply such concerns with capital to be used in the manufacture of articles, equipment, supplies or materials for war or essential civilian purposes."

Background Information For Building Shoe Factory Load

By C. C. TURNER
Special Representative,
Butane-Propane News

LET us visit a modern shoe factory. You are in for a lot of surprises if you have never been in one before. Time was in the past when one man did all of the work on a pair of shoes. All of his operations were necessarily by hand. It took him years to learn his trade, and if he became real expert he could produce one pair of shoes in a day.

Up to about 1785 there were no "lefts" and "rights" in shoes. In those days shoes were not made so much for comfort as for durability and warmth.

The genius of American inventors has cut the average labor time down to 15 minutes on a pair of shoes, although there are as many as 170 distinct operations in the manufacture of some types of shoes!

Very few shoe manufacturers "cure" or "tan" the hides which go into shoe production. An exception to this may be in the factory of those who produce suede leather shoes, and we shall consider this in a separate chapter, for here is another big opportunity for B-P Gases.

The leather is first taken to the top floor to what is known as the cutting room. Here each piece of leather required is cut out from patterns.

The next operation is that of skiving, which is the process of paring down the edges of the pieces of leather which have just come from the cutting room. Keen-bladed "skiving" machines trim off the surplus leather. The purpose of skiving is to make possible thin seams which will not hurt the foot. If the leather used is particularly spongy or "pebbly," even the sharpest skiving knives will not produce a smooth edge, so a singeing torch may be required to burn off the fuzz which is created. This torch must be equipped with a valve of the push-button type with either a by-pass flame around the valve to provide a low flame or a separate pilot light. Flexible hose connections to the torch will be required.

USE OF B-P GAS IN SMALL SHOE FACTORY

	Lbs. of Propane	*Gals. of Butane*	*Btu's*
12 steamers using 7000 Btu's each per hour for one hour during warming up	....	....	84,000
Working day of 9 hours, including noon, at 70% efficiency	....	....	529,200
Total for one day	....	....	613,200
Total for one year (300 days)	....	....	183,960,000
Converted to pounds propane	8503	....	
Converted to gallons butane	....	1777	
5 torches at 2000 Btu's per hour, for one year	....	....	27,000,000
Converted to pounds propane	1244	....	
Converted to gallons butane	....	268	
[redacted]			
Total propane, one year	9747	....	
Or butane, one year	....	2000	

The uppers now pass down a long row of special sewing machines which stitch them together and to the linings, each operator specializing on one seam. Various types of machines rapidly perforate the tips, insert hooks and eyelets, make buttonholes, sew on buttons, and lace the eyelet-type of shoe in order to hold the upper in proper shape for further processing.

While the uppers are taking shape, the stock-fitting room is busy making what is known as "bottom stock." This consists of outsoles, insoles, welting, counters, heels, and box toes.

We next come to the room that interests us the most, which is the lasting department. Here the uppers, box toes, and insoles are put on a "last," which is a wooden model shaped and sized to the foot which the shoe is intended to fit. On the "pull-over" and "bedlasting" machines the leather is drawn smoothly over and around the toe and heel, and is temporarily tacked into place. "Bottoming," which is the attaching of the soles to the uppers, may be done by sewing, cementing, or nailing.

In the lasting room of a small shoe factory there will be approximately 6 pull-over and 6 bedlasting machines. At each machine there will be a steamer, which, if it operates on B-P Gas, is capable of drawing about 7000 Btu. per hour. Actually, it operates at about 70% of its input capacity for 8 hours of working time and 1 hour during lunch period. For about an hour before the workday starts it is lighted by the watchman and run at full capacity while warming up.

Let us figure the potential load of a small factory on the basis of but 12 steamers. During the warming up period the twelve steamers will require 12 x 7000 = 84,000 Btu. During the 9 hours of operating at 70% capacity, they

will require 7000 x 0.70 × 12 x 9 = 529,200 Btu. 84,000 plus 529,200 = 613,200 Btu. per day, which, if the factory operates an average of 300 days per year, amounts to 183,960,000 Btu.! Convert this to pounds of propane and you have 8503 pounds, or if you sell butane by the gallon it would be 1777 gallons! Add to this about 5 torches which require an average of 2000 actual Btu. per hour and you have another 27,000,000 Btu. per year, or 1248 pounds of propane, or 268 gallons of butane. Approximately 10,000 pounds of propane per year, or more than 2000 gallons of butane—and this from one small shoe factory!

I digress in order to ask a very pointed question. How much investment in time and money would it require for you to acquire an equivalent volume of business or amount of net profit from domestic jobs?

Two Loads Are Compared

Grant that the net gas profit per unit of B-P Gas is but one-third as much on one unit of liquefied petroleum gas in industrial business because of the lower re-sale price which the industrial account receives (due to the greater volume which is involved), a small shoe factory is still equivalent to at least six domestic users, and the investment in equipment isn't anywhere near as much. Not as much service is required.

Both of these facts are even more true of a butane than of a propane installation. Then aren't we as an industry guilty of kicking silver dollars out of the way in order to pick up dimes if we neglect the industrial opportunities in our business?

OPERATIONS IN A SHOE FACTORY

Tanning leather (suede only).

Cutting leather by knife or machine from cardboard pattern (10 to 16 pattern required for every pair of shoes).

Skiving, or paring, down edges of leather. Singeing torch often required.

Stitching on sewing machines.

Making bottom stock — outsoles, insoles, welting, counters, heels, box toes.

"Lasting" and bottoming, or attaching uppers to bottoms by sewing, cementing or nailing.

"Making", or attaching heels.

Finishing, including removing lasts, packing, etc.

Coming back to our trip through a shoe factory; from the lasting department the shoes then go to the "making" department where the heels are attached on high speed machines which can process as many as 1500 pairs of shoes a day. Other machines remove the temporary tacks, after which the shoes go to the finishing department. Here they are scoured, cleaned and polished, and the lasts are removed. The ends of thread and rough protrusions are removed by hand torches. The shoes are then packed and are ready for market.

In our rapid trip through a shoe factory I have not called to your attention three other possible applications of B-P Gas. If the production schedule is so rapid that natural drying of the shoes is not possible, then you will find a drying kiln in the lasting department;

also, a smaller drying kiln in the finishing department.

If the edges of the taps have corrugations, these are put into the taps by machines with a heated branding iron which oscillates very rapidly. This branding knife is heated by a flame when the branding iron is in the last half of an oscillating movement as it draws away from the shoe tap. Many of these machines have used either manufactured gas or gasoline as a fuel for this purpose. Both fuels present a soot problem, and gasoline has the inherent danger of a liquid fuel. Operators like to get away from these disadvantages, and B-P Gas offers to them an ideal opportunity.

Now that we have a general idea of the way in which shoes are made and the applications to which liquefied fuel gases may be put, let us return to the lasting room, which is the important load building department in so far as we are concerned. What must we do in converting this department to B-P Gas operation? You will find this room already equipped with bedlaster and pull-over steamers, and if not equipped, the manufacturer will purchase the necessary steamers through trade channels.

There are bedlaster and pull-over steamers available which are designed for use with gas, but I am sorry to say that I have yet to see one of these gas steamers that is designed correctly for B-P Gas although the manufacturer may contend that his steamers are so designed. This is because the manufacturers of this equipment are located in cities where manufactured gases are available.

They build their steamers for manufactured gas, then stick a fixed orifice of the proper size for bottled gas into the steamer burner and call it a piece of B-P Gas equipment. Invariably proper provision for the venting of burned gases has not been made, and the holes in the burner are drilled too far apart for proper entrainment.

It is often more of a job to convert some of this so-called gas burning equipment than it is to convert electric steamers, and my personal preference is to convert electric steamers in my own way. If you are confronted with gas steamers, explain to the shoe manufacturer that he will be faced with a conversion bill.

Equipment Necessary for Conversion

Our first question in facing any conversion problem is, "What equipment is necessary in order to make the conversion?" My reply is, *"First, and most important is a knowledge of burner design."* If you do not have the other tools you can always find a machine shop that can do the work for you, but you can't supply the machine shop operator with the information as to HOW the job is to be done if you do not have this yourself.

Your fuel supplier should be one source for the information necessary for this, but you also can learn what is necessary about appliance conversions from Chapters

9, 11, 12, and 13 in "The Bottled Gas Manual."

You will find the usual hand tools essential. If you are to make evenly drilled burners you should have a drill press, but you can get along with a ¼-in. electric drill. Access to a milling machine is desirable. A ¾-in. pipe die and a good vise are essential.

Materials which must be available are as follows:

¾ in. black pipe.

¾ in. pipe caps.

⅜ in. pipe lock-nuts. These are the same kind that electricians use.

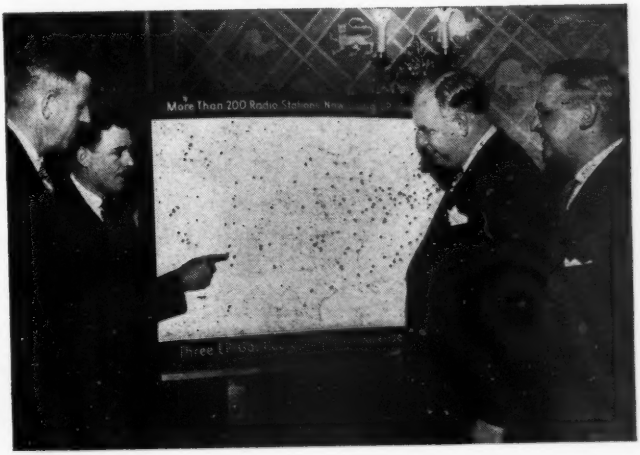
¾ in. mixing chambers. These should be of the type that can be threaded on to a ¾ in. pipe, and should be threaded for ⅛ in. pipe at the valve end.

⅜ in. gas valves with a ⅛ in. pipe thread at each end.

Orifice spuds of the type that can be tapped into the inside of a ⅛ in. pipe.

You will need about 16-in. of pipe on each unit to be converted, and one each of the other items listed. In addition to these materials you should have access to a supply of 3/16-in. and 1/4-in. stove bolts. To avoid stocking a lot of lengths you should carry a supply of both of these sizes in a 2 inch length, then cut them off if they are too long for the purpose. Corner brackets, mending plates, and corner braces in sizes up to 2 inches are always handy to have around a shop, and you may have need of them on some of your conversions and installations.

With these tools and materials at hand, you are now ready to tackle the job of converting bed-laster and pull-over steamers. In our next chapter we will roll up our shirt sleeves and get to work!



Members of the staff of the Lawrence H. Selz Organization, Chicago, publicity counsel, LPGA, show results obtained in radio publicity. More than 200 radio stations now use LP-Gas radio scripts regularly. Left to right: Association President Ernest Fannin; Budd Mulloy, Selz Organization; E. Carl Sorby, George D. Roper Corp., chairman of the publicity committee, and Frier McCollister, Selz Organization.

Safety

Test Exam on "NBFU 58"

PART I: UTILIZATION EQUIPMENT

PART of the "safety meetings" program of the Phillips Petroleum Co. concerns questions and answers on the National Board of Fire Underwriters Pamphlet No. 58 to familiarize employes with its important provisions.

The accompanying chapter, and two more to follow, cover this subject and the correct answers will be found on page 108, but first see what score you can make on these questions.

•

(1) All liquefied petroleum gases shall be odorized sufficiently to indicate the presence of gas

1. In a closed room.
2. In an open space.
3. In volume not over 1/5 lower limit of combustibility.
4. In volume not over lower limit of combustibility.

(2) All systems employed in distribution of liquefied petroleum gases shall be tested and listed by

1. Proper authority in county in which system is being installed.
2. State fire marshal's office.
3. Underwriters' Laboratories.

(3) A 130-lb. container aboveground may be installed

1. Against the side of building.
2. Ten feet away from building.

(4) Valve seat material used in connection with distribution of liquefied petroleum gas shall be

1. Metal (brass, steel, aluminum).
2. Asbestos fiber materials.
3. Material resistant to solvent action of propane.
4. Rubber.

(5) Where liquefied petroleum gas in liquid form is brought into a building without pressure reduction, such piping shall be

1. Heavy walled seamless brass or copper tubing.
2. Nickel alloy seamless pipe.

IT IS AN INcreasing practice among progressive companies to hold safety meetings in their own organizations. The Philgas Division of the Phillips Petroleum Co. is one such company. It has a well planned program, one that can be, and should be, followed as closely as possible by all dealers and distributors.

F. F. CAMPBELL

This Philgas safety program has been made available to the LP-Gas industry through F. F. Campbell, manager of the retail division, and will appear, chapter by chapter, in BUTANE-PROPANE *News*.—Editor.

Everything she could desire . . .

THE NEW FREEDOM GAS KITCHEN
featuring a fine ROPER GAS RANGE

The new Roper gas range is sure to steal the scene in those exciting New Freedom Gas Kitchens to appear after the war.

For housewives know that Roper's big "3-in-1" oven for even heat, speed and economy — its "Simmer-Speed" top burners for flavor-seal "waterless" cooking — its patented "Staggered" top for extra capacity and extra convenience — its "E-Z-Roll" Glo broiler for a clean, carefree broiling service — they know that these features are unexcelled in a cooking appliance.

ROPER GAS RANGES

GEO. D. ROPER CORPORATION, Rockford, Illinois, manufacturer of ROPER, *"America's Finest Gas Range"* built specially for use with L.P. (Liquefied Petroleum) gas.

Offices and Warehouses in Atlanta - Boston - Chicago - Cincinnati - Cleveland - Dallas - Denver - Los Angeles - Oakland - Philadelphia - Pittsburgh - Portland.

3. Standard wrought iron pipe properly coated.

(6) The internal diameter of such piping shall be

1. At least ¼ in.
2. Not greater than 3/32 in.
3. Nominal size.

(7) Approved flexible connections may be used

1. Only on high pressure side of regulator.
2. Only on low pressure side of regulator.
3. On either high or low pressure side.
4. Only between first and second stage regulators on 746 system.

(8) House piping used in connection with liquefied petroleum gas systems shall be

1. All aboveground.
2. Above or belowground.
3. Run as directly as possible.
4. Well supported and protected against mechanical injury.
5. Run 5 ft. from any opening in building.
6. Installed before system is installed.
7. Tested before gas is turned on.

(9) Hose used with liquefied petroleum gas systems shall be

1. Designed for bursting pressure twice the maximum working pressure of container.
2. Designed for bursting pressure five times the maximum working pressure of the system.
3. Hose used for transferring liquid from one container to another shall have valve at discharge end.
4. Hose used for transferring liquid from one container to another shall be equipped with brass connections.

(10) The discharge area of safety relief valves shall be sufficient

1. To permit easy adjustment with screw driver.
2. To prevent building up pressures in excess of 120% of the maximum permitted setting of safety relief valves on the container.
3. To permit easy inspection and replacement of valve seat.

(11) Safety relief valves shall be installed in such manner that they

1. Have direct communication with vapor space in container.
2. Discharge away from building adjacent to installation.
3. May be easily retested.

(12) Liquefied propane or butane may be piped into a domestic customer's home if the pressure is less than 20 lbs. and

1. The house is of fireproof construction.
2. The vaporizer is located outside of the house.
3. The vaporizer is less than one quart capacity and not artificially heated.
4. Welded steel piping is used with screwed fittings.

(13) Cylinders may be filled by

1. Liquid pump.
2. Venting vapors to atmosphere and permitting liquid to flow by pressure differential method.

(14) Cylinders may be stored when empty

1. With valve closed.
2. With valve open or closed.

(15) ICC containers may be

1. Installed belowground.
2. Installed either above or belowground.
3. Installed aboveground.

(16) ICC containers shall be installed

1. So the discharge from the safety relief valve is 5 ft. away from any building opening which is below the level of such discharge.
2. So the cabinet or nearest edge of cylinder is 5 ft. away from any building opening.
3. So there is ample working room on all sides of the installation.

(17) Container valves and connections shall be protected while in transit

1. By ¼-in. steel plate welded to cylinder.
2. By recessing connections into container.
3. By properly designed ventilated cap or collar fastened to the container capable of withstanding blows from any direction equivalent to a 30 lb. weight dropped 4 ft.
4. By painting red and attaching proper "Warning" tag to valve wheel.

(18) Relief valves are required

1. If container is not designed for maximum working pressure of product at 130°F.
2. If containers are to be shipped by common carrier.
3. On all Interstate Commerce Commission containers designed for handling liquefied petroleum gases.

(19) Reinstallation of ICC containers is permitted

1. If they have been tested in accordance with currently effective ICC regulations.
2. If the cylinder is not more than five years old.
3. If container has not been subjected to excessive temperature such as fire destroying building to which container is connected.

(20) Underground containers (ASME) may be reinstalled

1. If the protective coating has not been chipped or damaged.
2. If they withstand hydrostatic retests at the pressure specified for the original hydrostatic test as required by the code under which constructed.
3. If they have not been in use more than five years.

(21) Underground containers of 400 lbs. capacity must be installed ——— feet from any building or property line and ——— feet below the surface of the ground.

(22) Liquefied petroleum gases are officially classed as

1. Inflammable liquids.
2. Compressed inflammable liquids.
3. Compressed inflammable gas.
4. By-product of natural gas.

Next Month: Part 2.

E. D. Hagle Will Install New Dispersing Station

E. D. Hagle, formerly with California Butane Co., Los Angeles, announces plans to install a butane, gasoline and diesel fuel 100% truck service station on Highway 101 between Ventura and Oxnard, Calif.

Mr. Hagle will also install a butane and propane bulk plant at the same site.

More Tank Cars Needed to Meet 1945-1946 Demand

THE following bulletin has been issued by H. Emerson Thomas, chairman of the transportation committee of the Liquefied Petroleum Gas Association, detailing the efforts being made to secure sufficient tank cars to meet the industry's needs during next fall and winter:

"Many operators have been inquiring as to the possible transportation situation throughout the winter of 1945-46. We cannot give a full report at the moment, as the situation in Washington is not definite enough to give you the final probable results.

Officials Convinced of Need

"However, based on recommendations of the Association through the Transportation Committee chairman, we believe we have thoroughly convinced PAW, ODT and the War Department of the need of additional tank cars to take care of LP-Gas transportation. Although all of them agree that there is a need, the fact that there are these groups, plus WPB, in the picture, has made it hard to get it jelled down to a final definite answer and program of new car building.

"At first it looked as though the War Department was going to build 700 new propane cars, so that there would be flexibility in the fleet in carrying of propane, butane, butylene mixtures, etc. That program has been abandoned and PAW, ODT and War and Navy Departments have all recommended to WPB the building of 100 propane ICC-105A and 400-104A cars.

"However, just this past week, WPB refused to allocate the steel for these cars. The Government agencies have not given up yet and still hope that the 500 car program will be built. They realize that they must work rapidly now to get the steel in time for the cars to be built and to really take care of the problem of transportation next winter.

"Some have gotten the idea that with the European war ended, our problem would be materially lessened, but the opposite seems to be the case, based on the following factors:

"1. As the air forces are transferred from Europe to the Pacific, the need of aviation gasoline will be greater, because the planes will fly more miles each time they go into the air. This is going to require more aviation gasoline, thus requiring more of the base feed stock which has to be shipped in pressure tank cars.

Pacific Demand Must Be Met

"2. Next winter, there will be a large movement of material moving on the railroads to the Pacific Coast, some of which will be new material and some reconditioned material, brought over from Europe for transshipment to the Pacific. This is liable to tie up the railroads and cause our cars to move more slowly on turnarounds.

"3. Although we had a severe win-

PARTIAL LIST OF DISTRIBUTORS

L&H ELECTRICS

JUDSON C BURNS — Philadelphia, Pa
BONDURANT BROTHERS — Knoxville, Tenn
KEITH SIMMONS COMPANY, INC — Nashville, Tenn
LAVENSON & SAVASTA — San Francisco, Calif
McDONALD ELECTRIC COMPANY, INC — Miami, Fla
FRENCH NESTOR COMPANY — Jacksonville Fla
YANCEY COMPANY INC — Atlanta, Ga
ZION COOPERATIVE MERCANTILE INSTITUTION — Salt Lake City, Utah

L&H ELECTRICS and GAS

AMERICAN WHOLESALERS — Washington D C
APPLIANCE WHOLESALERS — Newark, N J
COMMONWEALTH SALES CORP — Richmond Va
ELECTRIC PRODUCTS, INC — Pittsburgh, Pa
GREUSEL DISTRIBUTING CORP — Milwaukee, Wis.
R P McDAVID COMPANY, INC — Birmingham, Ala.
R U LYNCH, INC — Providence, R I
WAHN DISTRIBUTORS, Division of Geo H Wahn Co. — Boston, Mass

L&H ELECTRICS, GAS, KEROGAS

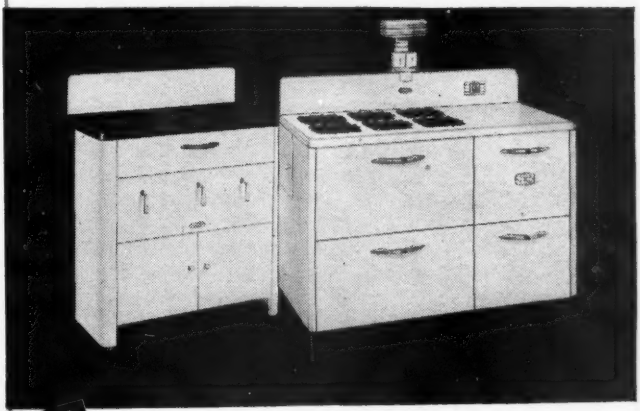
JULES ALEXANDRE, INC. — Harrisburg, Pa
BROWN CAMP HARDWARE COMPANY — Des Moines, Iowa
JANNEY SEMPLE HILL & COMPANY — Minneapolis, Minn
McDONALD BROTHERS — Memphis, Tenn
ODELL HARDWARE COMPANY — Greensboro, N C
PEDEN IRON & STEEL COMPANY — Houston, Texas
VAN CAMP HOWE & IRON CO — Indianapolis, Ind
THE GEORGE WORTHINGTON COMPANY — Cleveland, Ohio

KEROGAS

BELKNAP HARDWARE & MFG CO — Louisville Ky
BIRMINGHAM ELECTRIC BATTERY CO — Birmingham, Ala
FRANKFURTH HARDWARE COMPANY — Milwaukee, Wis
MILLER JACKSON COMPANY — Oklahoma City Okla
PAXTON & GALLAGHER COMPANY — Omaha, Nebr
B V REDMOND & SON — New Orleans La
SELLER BROTHERS & CO — San Francisco Calif
WYETH HARDWARE & MFG. COMPANY — St Joseph, Mo

"This I must tell you"

It's exciting, ear-tingling news! Something I've known for a long time, and now I must tell you about it. You've never seen anything so eye-arresting as the modern Kerogas oil ranges for postwar! They're stunningly beautiful—and as thrilling as a thrush's morning song. They have kitchen-tested, use-approved features bound to make every housewife sing like a lark — many new and improved labor-saving devices and that famous cooking ease which has delighted generations of housewives. Appliance merchants will be captivated by the profit-strong, desire-to-own appeal of Kerogas cooking and heating appliances. For an assured future, not just during the lush "take-away" period but also when selling gets really competitive, affiliate with L&H — the family-traditioned and time-honored line with 70 years of progressive and successful history back of it.



KEROGAS L&H ALCAZAR

A. J. LINDEMANN & HOVERSON CO.
MILWAUKEE 7, WISCONSIN

Manufacturers of ELECTRIC RANGES • ELECTRIC WATER HEATERS • GAS RANGES • OIL STOVES • PORTABLE OVENS • OIL HEATERS • WICKS

ter in the north last year, which primarily affected industrial users and gas standby installations, it was a relatively warm winter in the south; thus, if this year the south gets a cold winter, the fuel for heating needs will be so high that it may put a severe strain on the tank car fleets.

"4. There is a possibility that some of the War Department cars, which were originally built for anhydrous ammonia transportation, but which have been in use for LP-Gas movements, may have to be recalled by the War Department, which will decrease our fleet of the ICC-105A tank cars.

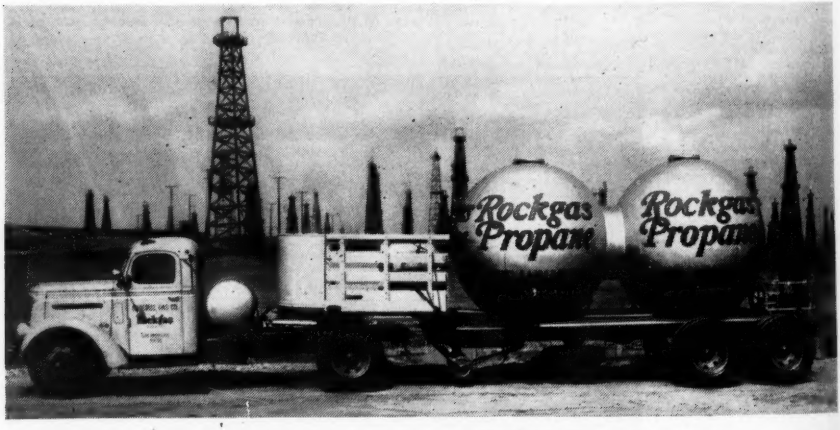
"All of these factors, plus the needed additional quantities of gas to take care of some consumer increase and some new urgent jobs, makes it appear that the additional car building program is a necessity."

California IAC Receives Suggestions From Industry

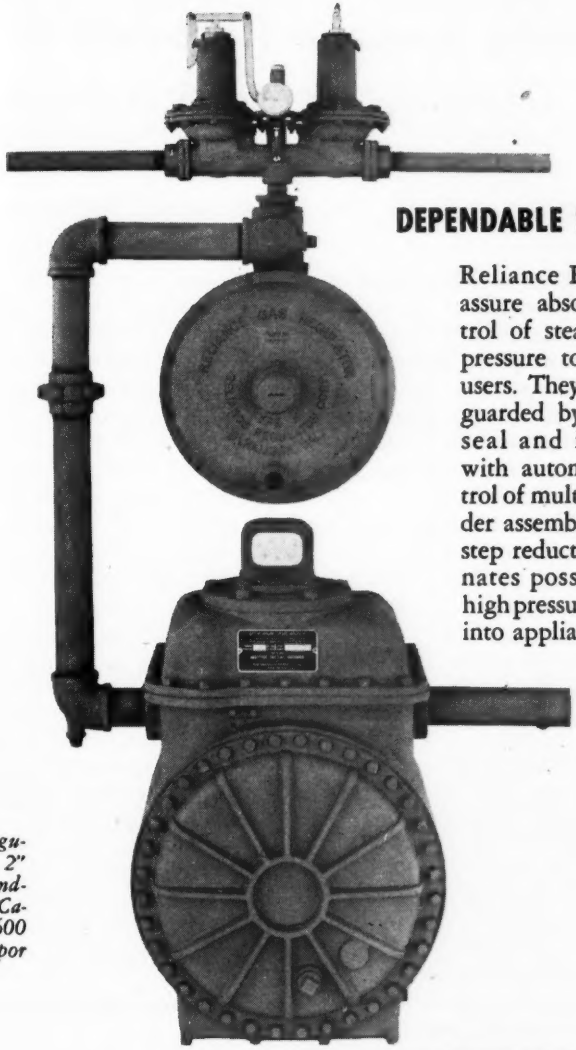
The California Industrial Accident Commission held public hearings on the liquefied petroleum gases safety orders in Fresno on April 26 and 27, and in Los Angeles on April 30 and May 1. There was a very good representation from all of those who are interested in this important subject.

The discussion was both general and in detail and there were many opposing views presented.

The Commission is now reviewing the transcript with the idea of embodying in the final code such suggestions as are deemed constructive and practicable. It will be some time yet before the final orders are published.



Imperial Gas Co., of Los Angeles, propane distributor, has just placed this new tank trailer in use to service the firm's bulk stations in southern California cities. The trailer will carry 500,000 gals. of propane per year in capacity loads of 3500 gals. The two spherical tanks, built by Superior Tank and Construction Co., Los Angeles, each 8 ft. in diameter, are engineered for 250 lbs. pressure per sq. in. Suspension of the trailer on springs below the axles gives it a low center of gravity. The trailer was especially designed and built by Fruehauf in cooperation with Mervin Jensen, superintendent of Imperial's Huntington Beach plant.



DEPENDABLE SERVICE

Reliance Regulators assure absolute control of steady outlet pressure to L-P gas users. They are safeguarded by a safety seal and installed with automatic control of multiple cylinder assemblies. Two-step reduction eliminates possibility of high pressures getting into appliances.

Type MC Regulator with 2" Type H Secondary Regulator. Capacity up to 6600 cu. ft. of Vapor per hour.

AMERICAN METERS

RELIANCE REGULATORS

RELIANCE REGULATOR CORPORATION
1000 MERIDIAN AVENUE, ALHAMBRA, CALIFORNIA

Increasing Propane Recovery In Natural Gasoline Absorption Plants

F. W. BELL

Chief Process Engineer, The Fluor Corporation, Ltd., Los Angeles

BECAUSE of the continued interest in propane as a substitute for butane in liquefied petroleum gas, and as an intermediate in chemical conversion processes, it is appropriate to consider methods by which its recovery can be increased in existing gasoline absorption plants.

The problem may be considered in two phases, one, increasing the extraction of propane in the absorber rich oil; the other, retaining the propane thus recovered in the distillation and fractionation sections of the plant.

When considering means available for increasing propane extraction in the absorber, it is convenient to use the absorption factor as a basis. This may be defined as follows:

$$A = \frac{L}{KV}$$

where A = absorption factor

L = rich oil from absorber in mols per unit time

V = rich gas to absorber in mols per unit time

K = equilibrium constant for component under consideration, in this case propane, at absorber pressure and temperature.

Inspection of the absorption factor equation makes it obvious that an increase in the mols of rich oil, usually obtained by increasing the lean oil rate, or a decrease in the equilibrium constant, will result in an increase in the absorption factor, assuming the vapor rate is to be held constant. More simply, this means that an increase in the extraction of propane can be obtained by increasing the molal oil/gas ratio or decreasing the equilibrium constant.

An increase in the molal oil/gas ratio may be obtained in two ways, one by using a lighter oil giving more mols per gallon of oil circulated, the other by increasing the actual volumetric circulation rate. In an existing plant it may be quite expensive to increase the actual volumetric flow rate, since it would probably require new lean oil pumps, additional exchanger surface, and possibly revamping of the absorption and stripping col-

There is a continued demand for propane as a substitute for butane in liquified petroleum gas, and as an intermediate in chemical conversion processes. Many operators of existing gasoline plants are interested in methods for increasing propane recovery in their plants with a minimum of capital investment and shutdown time. Means for obtaining increased propane recovery in existing absorption plants are discussed in this paper.

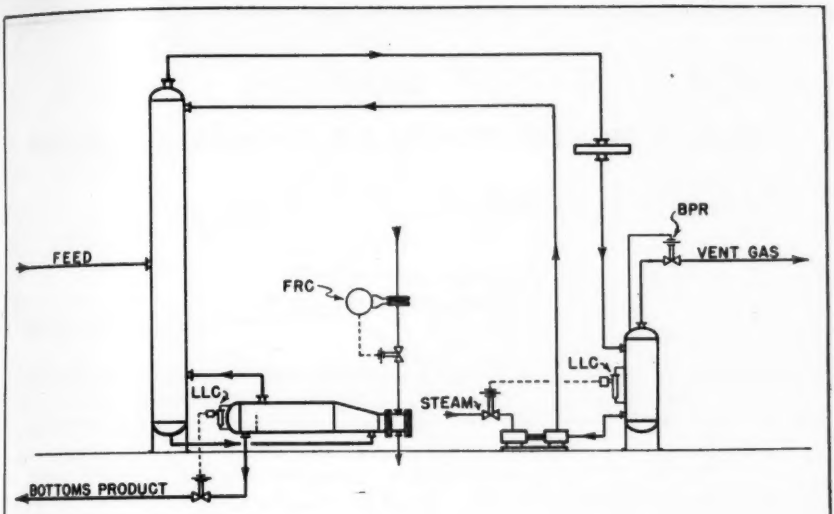


Fig. 1
DEETHANIZER CONTROL INSTRUMENTATION
FOR MAXIMUM PROPANE RETENTION

umns. On the other hand, it may well be possible that a lighter absorption oil could be used in the existing equipment without increasing the vapor pressure of the lean oil to the point where lean oil loss becomes excessive. A summary of calculations made to illustrate the effect on propane extraction of increasing molal lean oil flow with fixed gas rate by the two methods mentioned is presented in Table I.

These calculations were made for an existing plant in which the butane extraction is fairly low, only about 78% in the absorber. By inspection of Table I it will be seen that a reduction of the lean oil mol weight from 170 as used in the plant at present, shown in Case I, to 150, as shown in Case II, will result in an increased propane extraction of 666 gallons per day, or 8.6%. The calculations summarized in Case III were made to demonstrate the effect of an increase in volumetric lean oil rate for the original lean oil that would be required to obtain the same molal oil rate as in Case II.

For a 10% volumetric increase in the original lean oil, the same molal oil rate will be obtained as with the lighter oil, but the pounds of oil circulated will be materially increased, thus resulting in a somewhat lower absorption temperature due to the greater heat capacity of the lean oil. The 10% increase in volumetric lean oil rate gave an increase in propane

TABLE I

EFFECT OF INCREASED MOLAL OIL RATE ON PROPANE EXTRACTION

Absorber Pressure 135 psig
No. of Theoretical Trays — 12
Temperature of Lean Oil — 80°F
Temperature of Wet Gas — 80°F

	RICH GAS		RICH OIL COMPOSITIONS					
			Case I		Case II		Case III	
	Mols/Day	Mol %	Mols/Day	Mol %	Mols/Day	Mol %	Mols/Day	Mol %
CO_2	2,378	5.71	77	.50	85	.50	85	.50
C_1	31,933	76.67	617	3.99	675	3.97	690	4.04
C_2	2,772	6.66	281	1.82	306	1.80	314	1.84
C_3	2,504	6.01	744	4.81	808	4.75	828	4.85
C_{4i}	351	.84	222	1.44	240	1.41	246	1.44
C_4	920	2.21	773	5.00	814	4.79	834	4.88
C_{5i+}	792	1.90	792	5.12	792	4.66	792	4.64
Lean Oil			11.954	77.32	13.290	78.12	13.291	77.81
Total	41,650	100.00	15,460	100.00	17,010	100.00	17,080	100.00

Lean Oil Rate, g.p.m.	205	205	228
Lean Oil Gravity, °API	40	43.3	40
Lean Oil Molecular Weight	170	150	170
Absorption Temp., °F	102	103	101
Dry Gas Outlet Temp., °F	84.6	84.9	85.1
Propane Increase, %	0	8.6	11.3
Propane Increase, Gals/D	—	666	874

NOTES: Case I is the original design basis. Case II illustrates the use of a lighter lean oil. Case III illustrates the increase in volume rate of original lean oil required to obtain same molal oil rate as in Case II.

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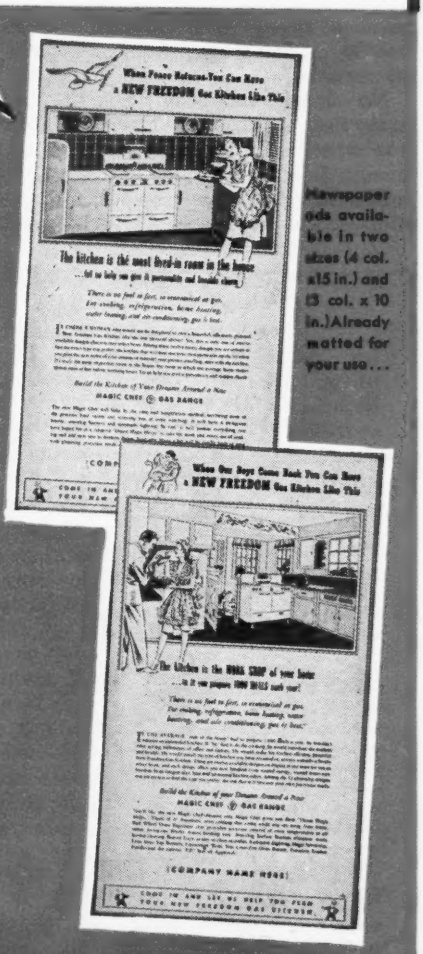
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extraction of 874 gallons per day, or 11.3%. Since we are interested, in this paper, only in methods for obtaining an increase in propane recovery, we will not discuss in detail the effect of these changes on butane recovery, but should call to your attention the fact that an increase in butane extraction also resulted. In plants that are already obtaining high butane recovery there would be no material change in the butane extraction by these small changes in lean oil rate.

No attempt has been made to evaluate the increase in absorption oil loss when using the lighter lean oil, since it is quite possible to use a narrower boiling range oil with a lower endpoint without materially increasing the vapor pressure of oil from the still. In actual fact, it is likely that the use of a lighter oil may make it possible to obtain a greater volumetric circulation with the existing equipment, as the oil will have a lower viscosity, thus resulting in less pressure drop through the exchanger and lines.

It should also be pointed out that the use of a lighter oil would result in fewer pounds being circulated per unit volume so that the exchange equipment could easily handle the increase in volumetric oil rate up to the point where the weight of oil circulated equaled the original weight of oil. The problem of selection of absorption oil should always be given very careful consideration, both in ex-

TABLE II

EFFECT OF REFRIGERATION OF OIL AND GAS TO ABSORBER ON PROPANE EXTRACTION

Absorber Pressure – 135 psig No. of Theoretical Trays – 12

	RICH GAS		RICH OIL COMPOSITIONS											
			Case I		Case II		Case III		Case IV		Case V		Case VI	
	Mols/Day	Mol %	Mols/Day	Mol %	Mols/Day	Mol %	Mols/Day	Mol %	Mols/Day	Mol %	Mols/Day	Mol %	Mols/Day	Mol %
CO_2	2,378	5.71	77	.50	84	.53	81	.52	88	.55	90	.52	96	.55
C_1	31,933	76.67	617	3.99	669	4.24	652	4.17	698	4.38	725	4.19	767	4.38
C_2	2,772	6.66	281	1.82	316	2.00	299	1.91	333	2.09	339	1.96	366	2.09
C_3	2,504	6.01	744	4.81	847	5.37	796	5.09	903	5.67	912	5.27	992	5.67
C_{4i}	351	.84	222	1.44	256	1.62	241	1.54	279	1.75	274	1.58	302	1.73
C_4	920	2.21	773	5.00	855	5.42	821	5.25	884	5.55	878	5.07	903	5.16
C_{5+}	792	1.90	792	5.12	792	5.02	792	5.06	792	4.97	792	4.58	792	4.53
Lean Oil			11,954	77.32	11,956	75.80	11,956	76.46	11,953	75.04	13,290	76.83	13,282	75.89
Total	41,650	100.00	15,460	100.00	15,775	100.00	15,638	100.00	15,930	100.00	17,300	100.00	17,500	100.00
Temp. Gas in, °F			80		80		60		60		80		60	
Temp. Gas out, °F			84.6		68.3		78.5		64		65.9		62.5	
Temp. Oil in, °F			80		60		80		60		60		60	
Temp. Oil out, °F			102		92		97		86		94		86	
Absorption Temp., °F			102		92		97		86		94		86	
Lean Oil Rate, g.p.m.			205		205		205		205		205		205	
Lean Oil Gravity, °API			40		40		40		40		43.3		43.3	
Lean Oil Mol Weight			170		170		170		170		150		150	
Propane Increase, %			–		13.8		7.0		21.4		22.6		33.3	
Propane Increase, Gals/D			–		880		541		1653		1748		2579	

NOTES: Case I – The original design basis. Oil and gas in at 80°F.
Case II – Lean oil only refrigerated to 60°F.
Case III – Rich gas only refrigerated to 60°F.
Case IV – Lean oil and rich gas both refrigerated to 60°F.
Case V – Lighter oil used with same volume rate as before. Lean oil only refrigerated to 60°F.
Case VI – Same as Case V, with rich gas and lean oil both refrigerated to 60°F.

sting plants and in the design of new lants.

The equilibrium constant may be ecreased either by increasing pres- ure or decreasing temperature. In xisting plants it is not ordinarily ractical to increase the absorption ressure, so that we will consider nly means for reducing the absorp- ion temperature. This may be done y refrigeration applied to the lean il, rich gas, or both.

Distribution Is Important Factor

The distribution of cooling between he oil and gas should be carefully studied since it is possible to cool the oil too much without also cooling the gas. Consideration must be given to the heat of absorption, heat capacity of the oil and heat capacity of the gas to determine the proper distribu- tion of cooling between oil and gas. Each case must be considered indi- vidually. A summary of calculations made to illustrate the effect of re- frigeration on propane extraction is presented in Table II.

The same absorption case was used n preparation of Table II as in Table I. It was assumed that the oil or gas could be cooled to 60° F. from an original temperature obtained with water of 80° F. In all cases it was assumed that the volumetric lean oil rate would be held constant at 205 GPM with a rich gas rate of 41,650 mols per day. Case I illustrates the absorption obtained with water cool- ing only. Case II illustrates the ef- fect of cooling the oil only. The pro- pane extraction increased 880 gallons per day, or 13.8%.

Case III illustrates the effect of re- frigeration of the gas only to 60° F., resulting in an increase in propane extraction of 541 gallons per day, or 7%. Case IV illustrates the effect of refrigerating both the oil and gas to 60° F., resulting in an increase in propane extraction of 1,653 gallons per day, or 21.4%.

Since it is possible to use a lighter lean oil because of the lower tempera- ture at the top of the absorber re- sulting in a lower partial vapor pres- sure of the oil at this point, it is de- sirable to include calculations show- ing the effect of combining a lighter lean oil with refrigeration. Case V illustrates the use of 150 mol weight oil in place of 170 mol weight with the lean oil only refrigerated to 60° F., giving an increase in propane ex- traction of 1,748 gallons per day, or 22.6%. Case VI illustrates the use of the lighter lean oil with refrigeration of both gas and oil to 60° F., result- ing in an increase in propane extrac- tion of 2,579 gallons per day, or 33.3%.

It should be pointed out that the temperature to which the streams can be refrigerated is limited by the point of hydrate formation.

The equilibrium constant can also be reduced by using intercooling to obtain a reduction in the absorption temperature where the temperature rise without intercooling exceeds 15° F. to 20° F. No calculations are pre- sented covering the use of intercool- ers, but it should be pointed out that where intercoolers are used it is im- portant that they be properly located in an absorber and that the oil circu- lation be maintained in order to in- crease the extraction of propane. The location of the intercoolers is a func- tion of the gas-oil ratio which affects the temperature gradient in the ab- sorber. In general it is difficult, from a mechanical standpoint, to add inter- cooling to existing equipment.

Another way in which the propane extraction may be increased is by the addition of trays in the absorber or by improving the tray efficiency of existing absorbers. Increasing the number of absorption trays is effec- tive on propane extraction only where

the absorption factor is between approximately 0.6 to 2.0, depending on the number of theoretical trays in the existing absorber. Revamping or addition of absorber trays is a somewhat expensive and mechanically difficult task in an existing plant.

Must Study Individual Plants

The next phase to be considered in the problem of increasing propane recovery in existing absorption plants is the retention of the propane in the distillation and fractionation steps. Since every plant will differ in the matter of venting and stripping of the rich oil, these problems must be considered for each individual plant by someone competent to make the necessary process study. The main problem is to determine how best to dispose of the increased pickup of methane and ethane in the rich oil necessarily resulting with the increased propane extraction. The still vapor may be recycled to the main absorber or reabsorber, compressed and condensed, or compressed direct to the stabilizers. The amount of the still vapors may be materially reduced, or even entirely eliminated, by the use of stabilizer bottoms recycle to the still final condenser. It should be noted, however, that stabilizer bottoms recycle is effective only where the vapor pressure of the stabilizer bottoms product is considerably less than the vapor pressure of the still overhead product. This means that in general the still accumulator pressure must exceed 50 psig for effective use of stabilizer bottoms recycle.

One point which might be overlooked when attempting to use stabilizer bottoms recycle is that it is necessary to obtain thorough mixing of the recycle liquid with the still product vapor in the condenser, which requires that the condensers, where atmospheric, be of the upflow type, or where shell and tube give the ne essary mixing by effective baffling.

It is often desirable to recycle on a sufficient amount of the stabiliz bottoms to prevent the still overhe vapor from building up a high inte nal cycle through the absorption ste Where stabilizer bottoms recycle used to reduce or eliminate recyc vapors to the absorbers the adva tage is two-fold since it reduces o eliminates recompressor horsepow and makes the lean oil available fo primary absorption of the plant inle streams rather than secondary ab sorption of recycle gas.

The final point to be considered i retention of the propane in a de ethanizer column. This is anothe place where refrigeration should b considered because it is possible t reduce the amount of propane loss r quired for the production of refl for this column by reducing the co densing temperature. The tempera ture to which the de-ethanizer ove head vapor may be refrigerated again limited by the hydrate form tion temperature. The use of refri eration at this point should be studie from a profitability standpoint.

Controller Is Needed

One more thing that should be co sidered in connection with the d ethanizer is the method of control be used for maximum retention propane. This is illustrated in Fig. in which is shown a flow rate co troller on the steam to the reboiler obtain constant heat input with liquid level controller on the ref accumulator controlling the reflux r turned to the column so that all liq condensed in the overhead condens will be returned as liquid to the co umn. By the use of constant heat i put to the column to obtain the d sired stripping of ethane from t bottoms with a return of all liq formed in the overhead conden

maximum retention of propane is obtained regardless of cooling water temperatures.

To summarize the problem of increasing propane recovery in existing gasoline absorption plants, there are four things that can be done without making expensive or radical changes and with a minimum of shutdown time. These are:

1. The use of a lighter absorption oil.

2. The use of refrigeration on the lean oil and rich gas and de-ethanizer overhead.

3. The use of stabilizer bottoms recycle to the still final condenser.

The use of the de-ethanizer control method as described.

All of the methods should be given careful study to determine their economic feasibility before making any changes in a plant.

Oklahoma Fire Marshal Gets More Funds to Enforce Law

State Fire Marshal T. J. Ellis, Oklahoma liquefied petroleum gas administrator, is preparing to place in effect provisions of House Bill No. 307, passed by the recent state legislature and signed April 26 by Governor Robert S. Kerr.

The measure does not repeal any provisions of the present law but gives the administrator more funds with which to secure wider inspection and more general enforcement of regulatory provisions of present statutes governing the manufacture, sale, installation, handling and transportation of liquefied petroleum gases and equipment.

The new law, effective as of July 1, provides that after that date, no person, firm or corporation shall engage in Oklahoma in the manufacture, assembly, sale or installation of liquefied petroleum gas apparatus, or in the handling or transporting of such gases for use in such apparatus, without first obtaining a license from the state fire marshal to do so. The license fee is fixed at $25 per year, extending from September to August 31 of the succeeding year. Before securing such license an applicant must file with the fire marshal a bond for $2000.

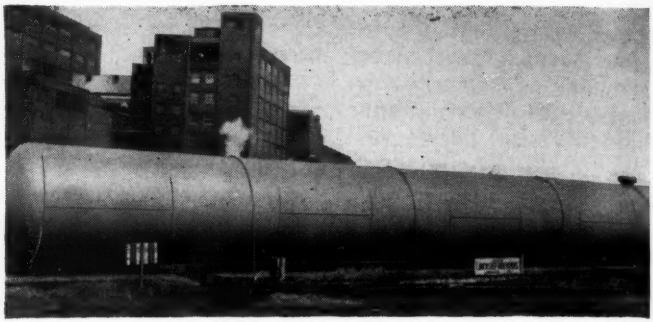
In addition, each installer of liquefied petroleum gas systems and appliances must pay an annual installation fee of $5. Issuance of such license is conditional upon the filing with the administrator a bond for $1500 and satisfying the administrator of the applicant's qualifications to make proper installations.

Of the new law Fire Marshal Ellis said: "This new law does not repeal any provisions of the present statutes on the subject but merely strengthens some of them, particularly in empowering my office to enforce provisions requiring use of more effective malodorant agents, so that the presence of gas can be detected more easily. In addition to giving my office more funds for inspectors' salaries and expenses, the new law gives me a license clerk and bookkeeper to aid in handling increased reports and details in the office."

Mr. Ellis said that he does not anticipate that general revision of present rules and regulations will be necessary but possibly a few changes may be proposed following sending out of notices to the industry and the holding of hearings.

House Bills Nos. 247 and 248, which failed to become laws, would have placed stringent new regulations on the transportation and handling of gasoline and liquefied petroleum gases in quantities of over 50 gallons.

Leadership In LP-Gas Storage



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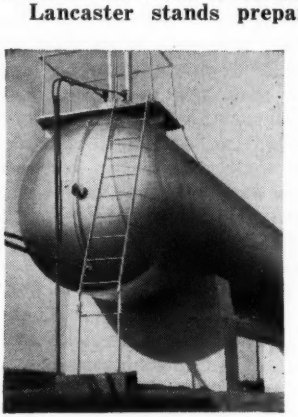

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QUIZ Cylinder Manifolding

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Questions	Answers
1 **Why are multiple cylinder installations made?**	For two reasons: 1. To take care of loads that a single cylinder cannot handle. 2. To provide continuous service for users; after first cylinder is emptied a reserve cylinder comes into use.
2 **How does an automatic two-cylinder regulator work?**	Gas is drawn from one cylinder until its pressure is reduced to approximately 5 lbs. per sq. in., at which time the gas starts to flow from the reserve cylinder.
3 **How is this accomplished mechanically?**	It is done by two-stage pressure reduction. The differential regulator is two regulators in one manifold. One is set for a downstream pressure of about 10 lbs. and the other for about 5 lbs. When the pressure on the service cylinder drops to 5 lbs., the regulator on the reserve cylinder opens. Pressure to the house line is reduced from the intermediate pressure to 11 in. of water with a simple regulator with the inlet side connected to the outlet side of the differential regulators.
4 **How can the customer tell when the service cylinder is empty and the reserve cylinder is in operation?**	An indicator or a pressure gage is actuated by the pressure in the downstream side of the high pressure regulators. When the pressure drops to 5 lbs. the indicator, or gage, shows reserve.

5

Can cylinders be changed without escape of gas and without shutting down consumer use?

Yes. Close the valve in the empty cylinder. Then set the regulator with the shifting mechanism from reserve to service. This then puts the reserve cylinder on the 10-lb. side which closes the other high pressure regulator as it now is set for 5 lbs. and gas will not escape when pigtail is disconnected.

6

What precaution should be taken before disconnecting cylinder?

Check should be made when indicator shows operation on service. If it does not, it indicates that pressure on service cylinder is below 5 lbs. and both regulators will then be open.

7

Can the indicator show one tank is empty when there is still fuel in it?

If the load on the system is too high for a single cylinder to carry, the pressure in this cylinder can drop to below 5 lbs. and still contain fuel. This can be noticed as a cylinder will be frosted.

8

How can this condition be remedied?

A multiple cylinder installation can be made by manifolding two or more cylinders in parallel, discharging into the high side of the regulator. A multi-cylinder installation should be made on the reserve side, as well, if the load is such that a single cylinder cannot take care of it until such times as full cylinders can be delivered.

9

What precaution should be taken if cylinders are connected to only one side of regulator?

If for any reason cylinders are not connected to both sides of automatic differential regulator, the other inlet should be capped off as it will allow gas to leak away when the pressure has dropped below reserve regulator setting.

10

Are all multi-cylinder installations fully automatic?

No. There are systems that provide an indicator and the customer manually makes the change from one cylinder to another. Others merely have a manifold with a check valve that allows one cylinder to be replaced without excessive loss of gas.

SUBJECTS TO BE COVERED IN FORTHCOMING ISSUES:

● How to Buy and Install Equipment ● Pipe Lines ● Testing for Leaks, Burner Adjustment ● Thermostats, Pilots and Pilot Controls ● Burner Design and Application ● Appliance Conversions.

Utility Use of B-P Gas Increased 138% During War

THE INCREASING importance of liquefied petroleum gas to the natural and manufactured gas industries was well set out recently in a paper presented to the Mid-West Gas Association by F. H. Andrews, Chemical Products Department, Phillips Petroleum Co., Bartlesville, Okla. Some of the facts emphasized are of outstanding interest to producers and marketers of butane and propane, so we have quoted liberally from Mr. Andrews' address.—Editor.

OF an estimated total volume use of 785,000,000 gallons of liquefied petroleum gas in 1944, which is exclusive of synthetic rubber, aviation gasoline, chemical industry, solvent dewaxing and similar non-fuel uses, 46,000,000 gallons, or 5.86%, was used in gas manufacturing processes.

This is a relatively small proportion of the total; however, we should recognize that in the four years 1941 to 1944, inclusive, the use for gas manufacturing purposes increased 25,715,000 gallons, or 134%. Indications are that this rate of increase will at least be continued postwar and probably materially accelerated.

Data obtained indicates that 239 towns or cities in 34 states are using liquefied petroleum gas in their operations. Less than 20% of these plants are operating on an enrichment or standby basis, the balance depending entirely on B-P Gas for all their send-out.

TABLE 1.—PROPANE-AIR PLANT CONVERSION COSTS

	Low Pressure		*High Pressure*	
Number of customers (meters)	500	1,000	500	1,000
Propane Plant Cost:				
(1) Remodeling of Buildings	$ 2,500	$ 3,000	$ 2,500	$ 3,000
(2) Propane Storage and Accessories	3,900	5,900	3,900	5,900
(3) Tank Car Unloading Facilities	950	950	950	950
(4) Vaporizing Equipment	650	650	650	650
(5) Diluting Equipment	1,600	3,200	950	3,500
(6) High Pressure Compressor	...	...	1,700	3,500
(7) Automatic Control Equipment	2,500	2,500	2,500	2,500
(8) Labor, Piping, Vaporizer Boiler, Supervision, etc.	4,200	6,000	5,000	6,800
Total Plant Cost	$16,800	$23,200	$18,650	$25,250
Conversion of Customer Appliances @ $5 per customer	2,500	5,000	2,500	5,000
Total Cost of Conversion	$19,300	$28,200	$21,150	$30,250

NOTE: Above equipment based on producing a minimum of 20 cfh. per customer.

TABLE 2.—NEW HIGH PRESSURE LIQUEFIED PETROLEUM GAS-AIR PLANT COSTS

Number of Customers	500	1,000
Development of Property	$ 4,500	$ 4,500
Plant Costs:		
Property	1,000	1,000
Plant Buildings	4,500	5,000
Railroad Siding	1,200	1,200
Propane Storage and Accessories	3,900	5,900
HP Gas Storage and Accessories		
80 lb. W.P. Storage—18-hour send-out capacity	5,200	10,400
Tank Car Unloading Equipment	950	950
Vaporizing Equipment	650	650
Diluting Equipment	950	1,900
Compressor	1,700	3,500
Automatic Control Equipment	2,500	2,500
Labor-Piping-Freight Boiler and Supervision	6,000	7,800
Total Plant Costs	$33,050	$45,300
Distribution System @ $100.00 per customer	$50,000	$100,000
Office Fixtures and Supplies	1,000	1,000
Total Investment	$84,050	$146,300

NOTE: Capacity of plant based on minimum production of 20 cfh. per customer.

The flame characteristics of propane and butane are shown in comparison to natural gas and mixed water and coal gas in Fig. 1.

In general, the flame characteristics are near those of natural gas, which allows full replacement of natural gas when the lower specific gravity of natural gas is compensated for by substituting propane-air or butane-air, of from 1500 to 1600 Btu. per cu. ft.

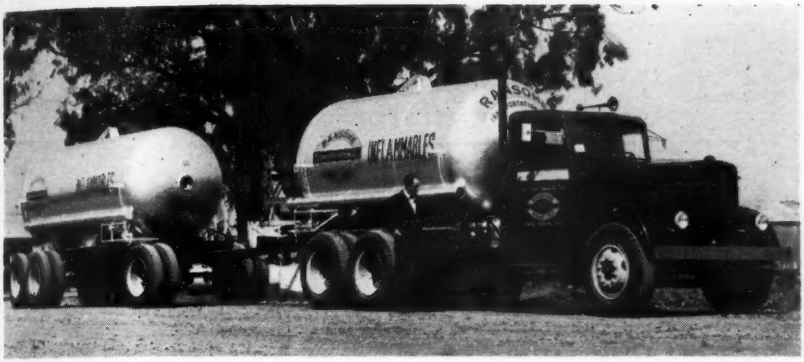
Except for light loads when propane vapor may be withdrawn from storage (atmospheric heat being sufficient to supply heat of vaporization), liquid under normal vapor pressure is withdrawn from storage, heated in a steam or hot water heat exchanger (which supplies heat of vaporization), passed in vapor form through suitable gas regulators and on to diluting and compressing equipment, for proportioning to the proper Bt content.

From the equipment the mixe gas can be added to the send-o stream or delivered to gas holde Such plants can be made fully aut matic from storage to distributi system.

There are two principal class of distribution—low pressure a high pressure. The cost of conve sion of existing plants from wat gas or coal gas to propane-a based on data we have obtain from numerous conversions, are a proximately as shown in Table

Until recently butane-air a propane-air plants represented t most widely publicized users liquefied petroleum gas by the g industry. Since there are appro mately 350 communities of o 2,500 population and nearly 2,0 communities having a populati of from 1,000 to 2,500 in t

L. P. G. TRANSPORTERS



The Ransome Transportation Company is an I.C.C. carrier, engaged in the transportation of propane and other liquefied petroleum gases.

Because of the very nature of these products special equipment and the "know how" of experienced personnel are essential to the fast and safe transportation and handling of butane and propane.

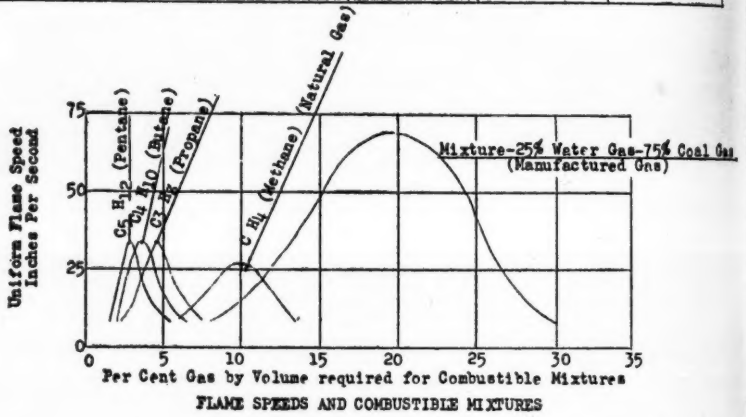
This company operates a large fleet of heavy duty trucks and trailers and offers its facilities to refineries and distributors of liquefied petroleum gases. Rates on full loads between stated points will be furnished upon request.

THE RANSOME TRANSPORTATION COMPANY

AVENAL, CALIFORNIA

FIG. 1. TYPICAL CHARACTERISTICS

Name	Formula	BTU/Cu.Ft.	Boiling Point °F.	Max. Flame Temp °F. (Gas-air)	Cu.Ft. Air Req'd for complete combustion
Methane	$C\ H_4$	1013	-250	3716	9.528
Ethane	$C_2\ H_6$	1792	-128	3742	16.675
Propane	$C_3\ H_8$	2550	- 44	3797	23.821
Butane	$C_4\ H_{10}$	3261	32	3747	30.967
Pentane	$C_5\ H_{12}$	3926	90	3762	38.113



FLAME SPEEDS AND COMBUSTIBLE MIXTURES

country which have no gas service, liquefied petroleum gas-air plants have opened up these heretofore unapproachable markets for piped gas. It is interesting to note the estimated cost of a propane-air plant at a new property as detailed in Table 2.

The investment necessary for small town gas plant distribution of undiluted propane would be less than the liquefied petroleum gas-air plant described in Table 2. This type of plant has proved economical because of the elimination of diluting equipment and compressors with consequent lower maintenance cost, and lower investment in plant mains, regulators, etc.

The natural and manufactured gas industries have other important methods of utilizing propane and butane in addition to replacement of present operations with liquefied petroleum gas-air or undiluted propane plants. Among these are peak load shaving; underfiring of coke ovens; enrichment replacement of Btu.'s lost on long high pressure transmission lines direct replacement, as in standby plants, and substitution for gas-oil in water gas sets.

YOU were the "silent partner"...

...when the BIG POSTWAR PUSH was planned for

TEMCO Gas FLOOR FURNACES

THE ENGINEERS were finished with redesigning and testing the new TEMCO Gas FLOOR FURNACE. And the A.G.A. put its seal of approval on their work. Then came the question of *selling* TEMCO after the war. And that's where you silently stepped into the circle of merchandising, sales, advertising and promotion men who were making the plans . . . plans pointed at one single objective—*to make selling smoother and more profitable for YOU.*

That job is ready now . . . ready to go to work with dealers who want to make money in the postwar heating market.

Quick Facts about the new TEMCO Gas FLOOR FURNACE

Re-engineered, to include new features developed in wartime experimentation.

Among the FIRST to gain A. G. A. APPROVAL under their new and stricter specifications.

Burns all Fuel Gases—natural, manufactured and L-P (Liquid Petroleum) with equal efficiency.

Fully Automatic—Minneapolis-Honeywell thermostatic controls, optional.

100% Safe—fully guarded by safety devices built in and included in selling price.

Has the new "WHISPER-QUIET BURNER"—Your assurance of silent flame performance.

Easy to Install.

Get the Whole Story—Now!

TEMCO dealers are being appointed now. Write us for the name of the nearest TEMCO distributor and he'll give you the whole picture. TENNESSEE ENAMEL MFG. COMPANY, NASHVILLE, TENN.

TEMCO also manufactures a complete line of SPACE HEATERS,—Radiant and Circulating—Gravity and Forced Air, combining the ultimate in heating efficiency with appealing beauty of design.

Specially engineered Bu-Pro-Fire Models for L.P. Gas

TEMCO
FLOOR FURNACES
"The Biggest Little Thing in Home Heating"

CURRENT READING

● Reviews of new books, pamphlets and articles published in recent magazines of interest to technicians and executives in the liquefied petroleum gas industry. Those interested in reading any complete article or book should write to the publications named.

●

Conversion of Oxygen Derivatives of Hydrocarbons Into Butadiene—G. Egloff and G. Hulla, "Chemical Reviews," February, 1945, pp. 63-141. Many organic compounds containing carbon, hydrogen and oxygen produce butadiene under thermal or catalytic conditions. In this respect, the behavior of oxygen derivatives parallels that of the hydrocarbons. Good yields of butadiene are obtainable from ethanol, butanols, butenols, 1, 3-butanediol, butanal, oleic acid, 2, 3-butanediol diacetate, 4-methyl-m-dioxane, cyclohexanol, and 1, 2-dihydroxybenzene. Most emphasis in the past has been on the production of butadiene in one stage, as in the cases of ethanol and 3-methyl-l-butanol.

Using the Velocity Head Concept in Pressure Drop Calculations—C. E. Lapple, "Heating, Piping and Air Conditioning," April, 1945, pp. 179-183. Part 1. Design of pipe lines, process equipment, ventilation systems, etc., requires estimation of pressure drops in order to specify the required pump, compressor, fan, or blower capacities. Pressure drop estimates are often necessary, too, in the operation of equipment for purposes of locating possible plugged or corroded lines, checking process performance, or determining bottlenecks for proposed capacity increases. This article is intended as a guide to a physical conception or visualization of otherwise seemingly complex fluid flow phenomena. The approximations presented will be found to be entirely adequate for many purposes, and an attempt has been made by the author to point out their limits of accuracy.

Diesel Maintenance Costs—T. M. Robie, "Industry and Power," April, 1945, pp. 68, 69, 103. Emphasizing the importance of operating records, the author explains the practices that must be followed to keep maintenance costs at the minimum and describes the successful maintenance routine of a pipeline company operating eight Diesel pumping stations.

Measuring and Controlling Liquid Level—E. Feller, "Power," April, 1945, pp. 63-86. From many scattered sources of information on liquid level, Power brings together a unified practical presentation of fundamentals with many examples of actual measuring and control devices. The selected examples will give engineers a good general idea of the principal types of liquid-level indicators and controls. This should provide a foundation for selection, installation, operation and maintenance.

Catalysis in Synthetic Liquid-Fuel Processes—H. H. Storch, "Industrial and Engineering Chemistry," April, 1945, pp. 340-351. The catalytic phenomena of three synthetic liquid fuel processes are discussed. These are the synthesis of liquid hydrocarbons from a mixture of hydrogen and carbon

monoxide, commonly called the Fischer-Tropsch process; the hydrogenolysis of carbonaceous materials such as coal and coal tar, usually termed the Bergius-I.G. process; and the catalytic cracking or reforming of fractions from petroleum or from middle oils obtained by way of the hydrogenation of coal and coal tar. The catalytic reactions of the last two processes involve rupture of carbon to carbon, carbon to oxygen, carbon to nitrogen, and carbon to sulfur bonds.

Analysis of Crankcase Oil in Gas Engines—R. Blodgett and D. M. Nelson, "Petroleum Engineer," April, 1945, pp. 114, 116, 118. An oil analysis and interpretation service has been employed for many years in maintaining automotive fleets. During the past year after the service had been pioneered in the field of natural gas engine operation as a joint effort of Long Beach Oil Development Co. and Faber Laboratories a number of other oil companies have applied this service to oil field operations and plants where a sufficient number of gas engines is in use to make it advantageous. The sampling, testing, and interpretation of results are described.

Solubility of Air in Petroleum Oils—W. A. Craig, "Petroleum World," March, 1945, pp. 43-45. This article describes tests carried out in the Engineering Department of Lockheed Aircraft Corporation on the solubility of air in various petroleum oils (gasoline, lubricants, hydraulic oils, etc.).

Determination of Water in Hydrocarbon Gases — H. Levin, K. Uhrig and F. M. Roberts, "Industrial and Engineering Chemistry," Anal. Ed., April, 1945, pp. 212-215. A method is described for determining water in normally gaseous hydrocarbons. It is based on the observation that when a gas containing moisture is contacted with cold dehydrated acetone, the water is retained by the acetone, in which it can be determined by reaction with acetyl chloride, titrating the liberated acid. Olefins and diolefins do not interfere and provision is made for correcting for interference by acidic or basic constituents of sample.

Cutting the Lag Between Research and Commercial Refining—"National Petroleum News," March 7, 1945, pp. R-187, etc. New laboratories of Phillips Petroleum Co. provide ample pilot plants and other modern facilities for study of synthetic rubbers and new petroleum products which will materially shorten the periods required for development work.

Measurement of Flow of Hydrocarbon Gases—H. Ten Broeck, "Petroleum Refiner," March, 1945, pp. 96-98. The purpose of this article is to show a method of calculating orifice coefficients directly in terms of the equivalent liquid volume. Because of the great variety of orifice equations in use and the confusion of symbols, the orifice equation for measuring gas flow is derived so that the reader can apply the method of this paper to his preferred orifice equation.

Determination of the Composition of Commercial Isobutane — J. W. Tooke and R. P. Roberts, "Oil and Gas Journal," April 7, 1945, pp. 98, etc. Apparatus and procedure are described, and results are discussed.

I. O. 7304—Bibliography of Bureau of Mines Investigations on the Production of Liquid Fuels from Oil Shale, Coal, Lignite, and Natural Gas, by A. C. Fieldner and P. L. Fisher.

What Dealers Are Thinking

IN a recent national survey of retail dealers selling household appliances in the United States, it was found by the "House Furnishing Review" that 94% will stock refrigerators (gas and electric combined); 74% will carry gas ranges and 73% electric ranges; 60%, space heaters; 56%, water heaters; 49%, oil ranges.

The survey also showed that 48% of the dealers expect the immediate postwar market will be primarily replacement; 30% anticipate it will be primarily new users, and 22% think it will be 50-50.

In considering price vs. quality, 85% expect a quality-conscious market; 10% will be price-conscious, and the remaining 5% look for an even division of interest.

Well-known brands will dominate sales, believes 91% of those answering this inquiry.

Helps That Dealers Want From Manufacturers. Eight types of help were suggested for immediately after the war. Dealers indicated that their preference was in this order:

1. Sales training help.
2. Participation in local advertising.
3. National advertising to the consumer.
4. Display materials.
5. Merchandising ideas.
6. Training of service men.
7. Sales promotion ideas.
8. Consumer education programs.

Offered by the reporting stores as other suggestions—ways in which manufacturers can help retailers after the war—were:

Help in reconditioning trade-ins.

Service on repairs; better delivery of spare parts.

Established retail prices.

Larger discount.

"Less Distributor."

Advice and sales help from field men.

Radio advertising.

Specialized Selling and Outside Selling. Better than 4 out of 5 leaders could give a definite "yes" or "no" answer on these questions.

Of those who replied, 86% will not do specialized selling (i.e., each salesman limited to a single appliance); 14% will; 81% will do outside selling; 19% will not.

Everett Webb, Kentucky Dealer, Killed by Gas Explosion

An explosion on last April 2 in a new home which he had been remodeling claimed the life of Everett Webb, liquefied petroleum gas dealer of Warsaw, Ky. With Mr. Webb at the time of his death was his 15-year-old son who was also killed in the blast.

Mrs. Webb has assumed the management of company affairs and will continue to operate the business with the assistance of men long in the company's employ.

Accessories for Stoves Now Permitted by WPB

L-23-c, as amended May 29, lifts restrictions on the manufacture and assembly of accessories for stoves, and use of bright work or metal finish containing copper, nickel or chrome.

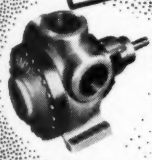
Interpretation 3 to the order, which clarified restrictions on chromium plating for reflector plates, is revoked.

SMITH BUTANE PROPANE PUMPS

For more than five years, SMITH Butane-Propane Pumps have been standard equipment with leading butane and propane engineers and distributors. Positive displacement balanced gear design has made SMITH Pumps excel in this very specialized service. SMITH fluid sealed packing box construction eliminates hazardous packing box leaks.

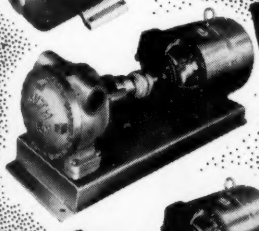
SMITH Pumps are designed for 250 lbs. working pressure and develop ample differential either for bottling service or for the simple transfer of stock. SMITH Pumps are of rugged construction and are dependable in service.

MODEL 1044 — For Truck Mounting . . . Direct connected to transmission power take off. Capacity 20 gpm at 500 rpm. Weight 40 lbs. Overall length 13-in., width 7½-in. Minimum inlet pipe connection should be 1½-in.

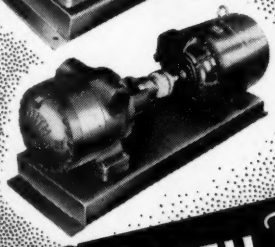


MODEL T-2 — For Truck Mounting . . . Direct connected to transmission power take off. Capacity 50 gpm at 500 rpm. Weight 90 lbs. Overall length 16-in., width 10-in. Minimum inlet pipe connection should be 2-in.

MODEL T-3 — For Truck Mounting . . . Direct connected to transmission power take off. Capacity 100 gpm at 500 rpm. Weight 125 lbs. Overall length 19-in., width 10-in. Minimum inlet pipe connection should be 3-in.



MODEL M-2 — For direct connection to Electric Motor drive. Capacity 50 gpm at 1800 rpm. Weight, pump only, 75 lbs. Overall length 16-in., width 9½-in. Minimum inlet pipe connection should be 2-in. This unit can be furnished complete with base and flexible coupling, and including 3 or 5 hp explosion-proof electric motor.



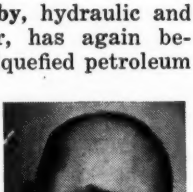
MODEL M-3 — For direct connection to Electric Motor drive. Capacity 100 gpm at 1800 rpm. Weight, pump only, 100 lbs. Overall length 19-in., width 9½-in. Minimum inlet pipe connection should be 3-in. This unit can be furnished complete with base and flexible coupling, and including 5 or 7½ hp explosion-proof electric motor.

WRITE FOR COMPLETE DESCRIPTIVE LITERATURE

SMITH Precision Products COMPANY
1135 MISSION STREET
SOUTH PASADENA, CALIFORNIA

THE TRADE

Raymond J. Kirkby, hydraulic and mechanical engineer, has again become active in the liquefied petroleum gas industry with his appointment to the post of project manager in charge of development of butane-propane equipment for Adel Precision Products Corp., Burbank, Calif. Adel manufactured products for the butane-propane industry will soon be presented to the trade, according to word coming from Mr. Kirkby's office.



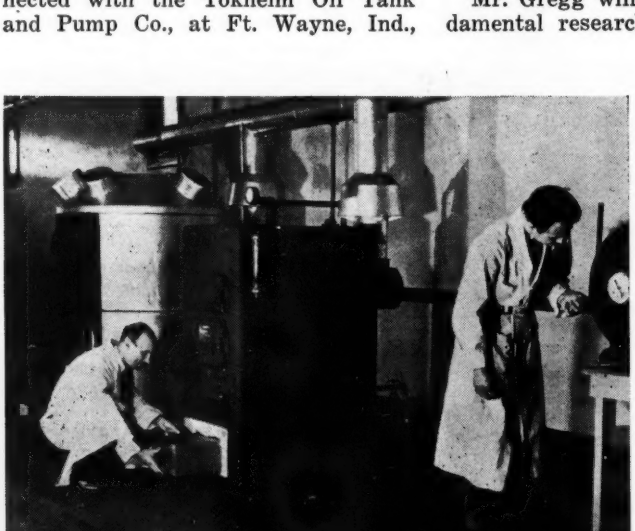
R. J. KIRKBY

Mr. Kirkby was previously connected with the Tokheim Oil Tank and Pump Co., at Ft. Wayne, Ind., where he worked for three years as chief engineer and manager of research and development. Prior to that he was with the Crane Co., Chicago, in charge of pump development.

A specialist in fluid conduction, he is a graduate of Bancroft College, London, England, and holds many patents in hydraulic and mechanical devises. Since the outbreak of the war his work on ordnance material has included aircraft and ground fuel transfer pumps and oiling and fueling equipment.

R. C. Gregg, formerly assistant chief research engineer of the American Gas Association Testing Laboratories, has joined the engineering staff of the Bryant Heater Co., Cleveland, O., it was announced recently by Lyle C. Harvey, president.

Mr. Gregg will be engaged in fundamental research work for Bryant



▲

Bryant Heater Co testing laboratory Mentor, Ohio.

▼

leading to new product development in the gas heating field.

N. Charlton Gilbert has been appointed industrial relations director for the Bryant Heater Co.

Prior to his new connection with Bryant Heater Co., Mr. Gilbert was personnel director for the A. C. Gilbert Co., New Haven.

The American Stove Co. recently held in Cleveland a three-day meeting for its "sales committee," created to handle postwar problems.

Sales potentials for the company's "Magic Chef" ranges, in both the city gas and B-P-Gas fields, were outlined and production schedules set up to endeavor to meet the expected requirements of dealers and utilities.

The sales and service training department, organized only recently, announced its plans for training present and new salesmen of the firm.

Tennessee Enamel Manufacturing Co. pre-war gas space heater and floor furnace builders, but presently making bombs and shell containers for the armed forces, has received the third star for its Army-Navy "E" flag—representing the fourth award for outstanding achievement in war production.

The Empire Stove Co., Belleville, Ill., peace time manufacturers of gas cooking and heating appliances, was recently awarded the Army-Navy "E" by Col. Lowell A. Elliott, Deputy Chief, Chemical Warfare Service, Washington, D. C.

The award was made for Empire Stove Co.'s achievements in the design and manufacture of airplane smoke tanks and for the rapidity with which they converted their plant to the production of incendiary bomb cluster adapters for use against Japan.

Robert Thompson, distributor of Ruud gas water heaters in the St. Louis, Mo., area, died suddenly at his home there on April 24.

Mr. Thompson's first connection with the gas appliance industry was as a salesman for the Peoples Gas Light & Coke Co., Chicago, Ill. Later he was associated with the Chicago office of the Humphrey Co., travelling for them in the state of Illinois until he became the Humphrey distributor in St. Louis in 1919.

With the merging of the Humphrey and Ruud sales organization in 1931 Mr. Thompson became the Ruud distributor in St. Louis.

H. T. Simpson is the new Pacific Coast manager of the Whitehead Heater Co. Division, Whitehead Metal Products Co., New York, manufacturers of gas-fired water heaters. Mr. Simpson was appointed to fill the position formerly held by Ralph L. Bailey, who died Feb. 16.

With the Whitehead organization since 1936, Mr. Simpson worked in Texas and Northern California. He will make his headquarters at the Los Angeles office, 3507 W. 6th St.

Entitled "Meet the Challenge," a new 28-page portfolio was recently put into the hands of the **Tappan Stove Co.**'s field organization.

Illustrating some of the important postwar competition factors as "challenges" the manufacturer and dealer will face in the merchandising of Tappan gas ranges, the portfolio shows constructive steps that are being made to meet these "challenges" which are outlined as "answers."

Prominent among them are plant expansion, new product development, national magazine advertising, and store floor planning to maintain and strengthen the value of the dealer franchise.

Meet Savory

The Toaster That Boosts Your L.P. Load

When you sell Savory, you sell more than a toaster! When you install a Savory, you emphasize the advantages of gas for commercial cooking and directly insure your L.P. load. Savory is the ideal toaster for outpost inns, resort hotels, roadside restaurants, and other commercial service establishments.

For your customers Savory will provide fast, convenient toast service at maximum economy during "peak" or "off-peak" periods . . . and Savory "*Appetized*" toast is bread at its best. If you're not already a Savory distributor, drop us a line. W.P.B. regulations covering gas toasters have been revoked, and we are prepared to give you reasonably prompt delivery.

Model PD, Gas-Operated
360 Slices Per Hour

Savory
EQUIPMENT, Inc.

137 Pacific Street, Newark 5, N. J.

SOLD BY LEADING DEALERS EVERYWHERE

Five New Appliances Studied By Gas Association

WITH the restriction placed upon work not essential to the war effort, and with all of the gas appliance manufacturers with design and research laboratories working full time on war production, the P.C.G.A. sub-committee for New Types of Gas Appliances has been faced with the task of trying to make progress under difficult conditions.

At the outset it was agreed they would endeavor to have produced at least one model of the appliances which they had hoped to have placed on the market with the lifting of war restrictions.

The committee decided to direct its efforts toward five items:

1. A built-in hydraulic dishwasher.
2. A portable hydraulic dishwasher.
3. A counter height gas refrigerator with separate drawers instead of a single door for handier food storage and conservation of cold air.
4. A vented bathroom heater to more than meet the best competitive type heater for bathroom use.
5. A small gas fired clothes drier.

Item No. 1, the built-in dishwasher, adds substantial gas load; also, its demand for hot water is such that competing types of water heaters should be oversized if an adequate supply of hot water is to be had at all times. Gas water heaters, however, due to their quick recovery, if originally correctly sized for other household needs, will usually do the job.

Briefly, this built-in unit requires only water connections for a complete and efficient dishwashing operation. Normal water pressure of 40 lbs. or more, through special recirculating jets, scrubs, scalds and rinses the dishes in a rotating basket. A hydraulic lift raises dishes from tub to drainboard level for easy loading.

This dishwasher has been little more than under test since 1937.

Hope for Commercial Production

Recently, ownership of the patents changed hands, whereupon the committee chairman got in touch with the new owner to lend every possible assistance toward getting this device produced on a volume basis for national distribution at a price within the reach of people of modest income.

Laboratory checks have substantiated the manufacturer's claim that, on the average, 15 gals. of additional hot water will wash, rinse, and practically dry a day's dishes for the average family. In home operation, however, the average usage of hot water will be found considerably higher due to the washer being frequently allowed to operate longer than is really necessary.

Appliance No. 2 is another dishwasher, almost unknown and probably not patentable, although a patent was applied for. It was almost "backyard manufactured," and at least one similar item came on the market in a small way. Prices ranged from $18.75 to $39.50. It was a spun job, hand assembled, did a good dishwashing job, but had two drawbacks. It was too big to go on a kitchen shelf, and will continue with this drawback; and the price was excessive. Mass produced with pans pressed instead of

spun, it should retail for around $10.00.

Appliance No. 3 is a counter height gas refrigerator, a definite "must."

Item No. 4 is a vented bathroom space heater. Competitors are coming out with a newly designed, almost body length, radiant heater. So is the gas business, and it will provide substantially more heat at considerably less cost. Also its installation in new construction, including vent, can probably be made at equal or less cost than for the competing type.

At the request of the committee, models have already been designed, produced and installed for testing in several homes recently completed by one of the largest home building companies in southern California.

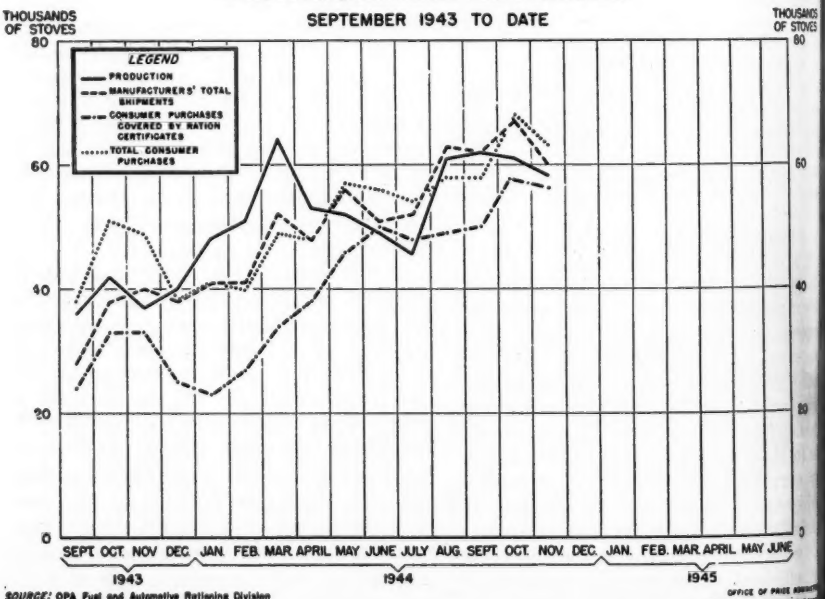
The committee believes that with energetic promotion this new appliance will go a long way toward lessening the number of installations of electric bathroom heaters.

Item No. 5 is a small gas-fired cabinet for the drying of stockings and underwear not usually sent to the laundry. This item is still in process of development by one of our local manufacturers. Intention is to size it for bathroom, back porch or any location where a small amount of space can be made available.

GAS COOKING STOVES

PRODUCTION, SHIPMENTS AND PURCHASES

SEPTEMBER 1943 TO DATE



SOURCE: OPA Fuel and Automotive Rationing Division
Consumer Durables Rationing Branch

OFFICE OF PRICE ADMINISTRATION
FUEL AND AUTOMOTIVE RATIONING

Watch for New Developments from Sprague

A great many improvements in all fields of endeavor will evolve from scientific advancements in this war.

New chemicals, new metals, better plastics, synthetics and electronics will find application in civilian goods. It staggers the imagination to visualize what the future may hold.

In any event, you can be assured that SPRAGUE will continue to be in the forefront as it has been for the past forty years.

THE SPRAGUE METER CO.
BRIDGEPORT, CONN.

All Butane-Gas Kitchen Is Dealer's Postwar Plan

All housewives dream of a "push button" type of kitchen—one where drudgery will be eliminated and clean, shining appliances will speed her work.

Postwar plans of Claude G. Berry, manager of Eastern Butane Consolidated in Tahlequah, Okla., bring these dreams closer to reality in a detailed plan for handling the most modern equipment available through their two appliance stores.

A dealer in butane gas throughout Eastern Oklahoma, Mr. Berry's plans include an "all butane-gas kitchen" and he has recently acquired the franchise for the Servel Electrolux refrigerator line and a standard washing machine, hoping to stock these items as soon as production for civilian use is under way.

Working with Mr. Berry on these merchandising plans is W. C. Harrison, recently employed as sales manager in charge of appliance sales for Eastern Butane Consolidated. Mr. Harrison is well known throughout eastern Oklahoma.

Eastern Butane Consolidated operates a fleet of tank trucks for butane users with a large storage tank in Stilwell and another at Tahlequah.

New Testing Laboratories For Southern California

The Southern California and Southern Counties Gas companies have opened a new gas appliance laboratory at 1700 Santa Fe Ave., Los Angeles, according to Guy Corfield, research engineer of the former company.

The laboratory, under the direction of H. L. Warren, has complete facilities for testing and developing gas appliances.

The work will supplement, rather than duplicate, the work of the AGA Testing Laboratories.

This new 4000-gal. butane truck is one of a fleet of trucks serving Eastern Oklahoma with butane ("Berry-Gas") from the headquarters of Eastern Butane Consolidated in Tahlequah.

Butane—POWER—Propane

Truck Fleet Operates 10 Years On Butane

LIQUEFIED PETROLEUM GAS is today recognized by everyone acquainted with it as a superior type of motor fuel, capable of producing power at greatly reduced costs and adding markedly to the life of the engine.

In coming months BUTANE-PROPANE *News* will present "Case Histories" of truck fleets that have been operating on butane or propane. It will be the desire of the publishers to present facts and figures helpful to those wanting to learn more about this modern motor fuel. Questions or suggestions from the readers will be appreciated and will help in the presentation of this series.—Editor.

Case History No. 1

COMPANY: Crown Products Co., 4578 Worth St., Los Angeles, Calif. Manufacturers of Lady's Choice Food Products.

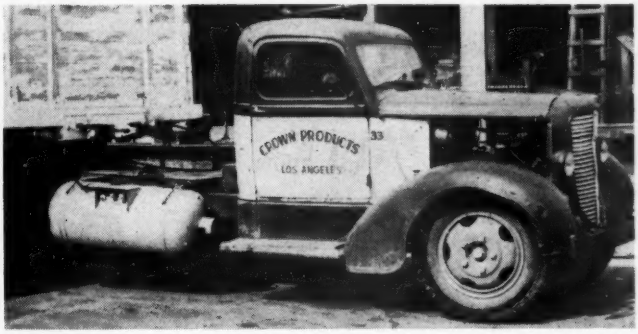
FLEET HISTORY: The first installation of butane equipment was made in 1935. Since that time all equipment operated by the company has been converted to butane.

By PAUL LADY

(For the purposes of this report, only the equipment operated from the Los Angeles plant has been considered. A second butane-equipped fleet of 8 semi-tractors and 5 trucks is also operated out of San Francisco.) The management is completely satisfied with butane as a motor fuel, finding that it realizes greater economy, longer motor life and decidedly lower maintenance costs.

EQUIPMENT: 10 trucks, ranging from 70-85 hp., Dodges; 12 semi-tractors, from 85 to 200 hp., Brockways with Continental motors.

CARBURETION EQUIPMENT: Manufactured by Century Gas Equipment Co., Lynwood, Calif.

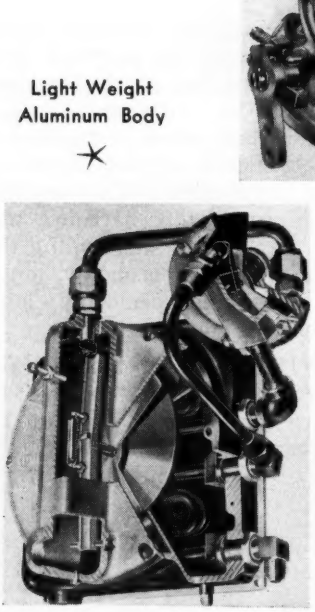


The oldest truck in the fleet is this 1935 Dodge. It has operated on butane since that time, adding up a total of well over 500,000 miles.

THE PERFECT COMBINATION FOR
BUTANE-PROPANE FUELS
ALGAS MIXER PLUS *ALGAS* CONVERTER

Light Weight
Aluminum Body

SAE Sizes
1¼" to 2½"



ALGAS Converters combine primary–secondary regulation

MODEL 1080
Range: 25 to 175 H.P.

MODEL 1200
Range: 125 to 450 H.P.

OPERATING PRESSURE OF CONVERTERS

Inlet—Tank Pressure — Outlet—Atmospheric

Convert from gasoline or replace present Butane-Propane equipment for better operation of your engine with the Algas Multi-Jet Mixer and Converter.

Service Available Throughout U.S.A.

AMERICAN LIQUID GAS CORPORATION

Los Angeles — Chicago

1109 Santa Fe Avenue, Los Angeles 21, California

The Century model F converter, which is a combination heat exchanger and high and low pressure regulator, is in use. Also the Century carburetor with atmospheric regulator. On the new Brockway, with 200 hp. Continental motor, the new Century model K converter, for engines up to 500 hp. is in use.

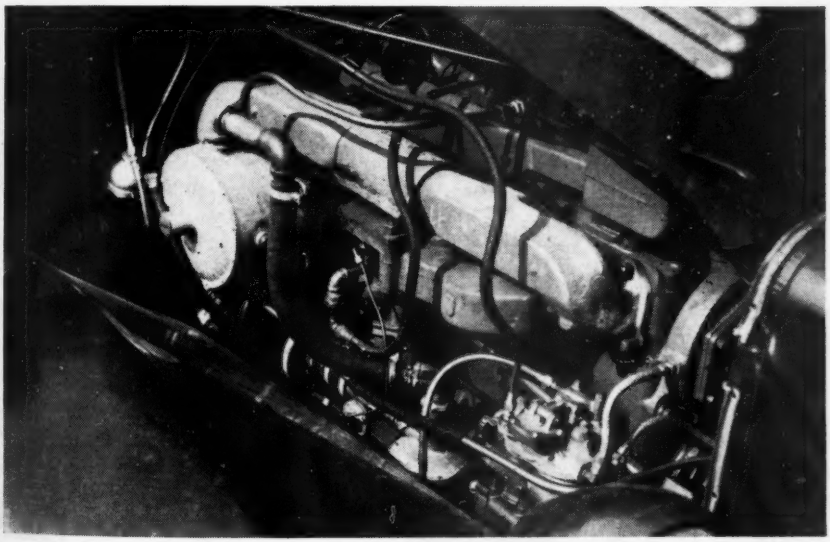
CONVERSION FACTS: At Crown it takes two men one day to make the change-over from gasoline to butane. This includes the installation of all carburetion equipment and pressure tanks.

The present cost of a butane installation on the large Brockways totals around $250. This includes two 65 gal. pressure tanks. No attempt is made to economize at the expense of a good installation.

Tackometers are installed on all trucks and drivers are instructed to use them continuously. This practice is made mandatory to avoid the lugging of motors. Due to the absence of ping on butane operated motors it is difficult to determine when a motor is lugging unless some such equipment is used.

FUEL CONSUMPTION: Trucks average 8 miles to a gallon; semis average 4 miles to gallon. This is about the same as on gasoline; however, it is acknowledged that gasoline does have a slight superiority in mileage comparisons.

POWER: On butane the power is definitely increased. It has been found upon testing, with similar



Century converter, which includes heat exchanger and high and low pressure regulators, can be seen on newly converted Brockway. This is one of the biggest trucks ever converted for this fleet, having a rating of 200 hp.

Dependable Carburetion

VITAL

TO THE OIL INDUSTRY

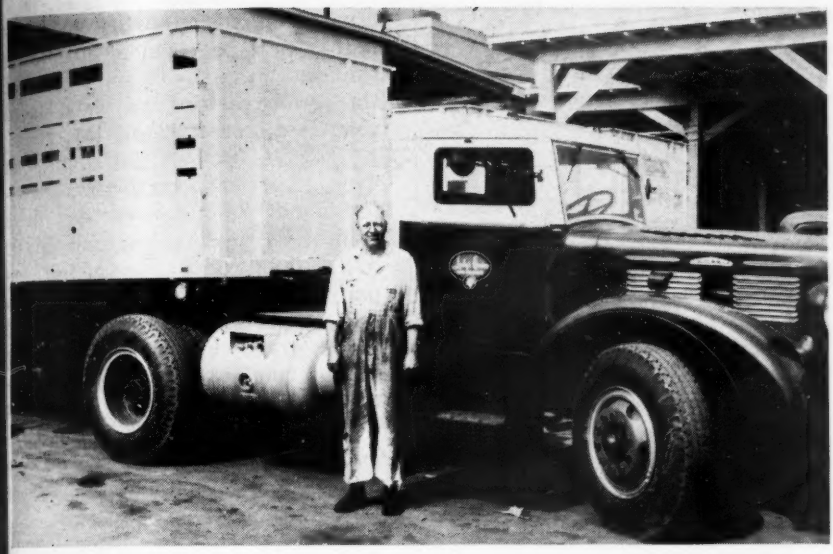
In the oil industry, dependable carburetion is a factor of vital importance. The engines used on today's mammoth drilling rigs, well-servicing units, pumping units and in refineries and cycling plants demand dependable carburetion to develop maximum, effective power from the fuel used.

ENSIGN Carburetors for Gasoline, Natural Gas, and Butane-Propane are faithfully serving every phase of the oil industry—helping to maintain the ever-increasing flow of this all-important fuel. And this is only one example of the universal use of ENSIGN Carburetion Equipment. In every industry, in war and peace, ENSIGN Carburetion is dependable carburetion. Where peak production demands efficient power, you'll find ENSIGN.

ENSIGN

CARBURETOR COMPANY

HUNTINGTON PARK, CALIFORNIA



Head mechanic, Ray Replogle, beside one of the big new Brockway semis. One of the two 65-gal. butane tanks can be seen. This truck, one of four new units to be added to the fleet, has just been converted.

loads on the same grade, that the trucks operate one gear higher after conversion to butane. On long hauls to distant points—San Francisco, Reno—several hours can be lopped off the travel time.

OIL: In the case of this fleet, no great saving on oil is reported. This is due, however, to a company policy that calls for a change of oil every 1000 miles regardless of fuel used or oil condition. This policy is based on the theory that oil, no matter how clean, has a definite acid content after heavy duty operation. For this reason the oil is changed far more often than many other truckers feel is necessary. Oil of 30 weight is used, and each truck is equipped with filter.

OPERATING FACTS: Ray Replogle, mechanic in charge of the fleet, states that they have proven their maintenance costs are lower with butane operation. Speaking from experience gained from 35 years as an automotive mechanic, Mr. Replogle states that a properly equipped truck will give twice the period of service on butane as on gasoline. In making such statement, he gives these facts: The entire Los Angeles' fleet of 46 pieces of rolling equipment, which includes trucks, semis and trailers, is kept in good running order by himself and one assistant. This is possible because the butane-operated trucks demand less time for maintenance and overhaul than they would if run on other fuels.

Loads hauled vary from a few

CENTURY

Manufacturers, for over 18 years, of butane-propane, natural gas, and combination carburetion equipment, for . . .

Trucks—Tractors—Oil Field Engines — Stationary Units

New—Model K Converter

for engines of large horse power . . . up to 500 H.P.

Properly Engineered
Proven Dependable
Modern - Compact

CENTURY GAS EQUIPMENT CO.

11188 Long Beach Blvd.
LYNWOOD, CALIFORNIA

hundred pounds for the small city trucks to a pay load of 20 tons on the big "semis." Gross weight of the semi-tractor and two loaded vans totals over 72,000 lbs.

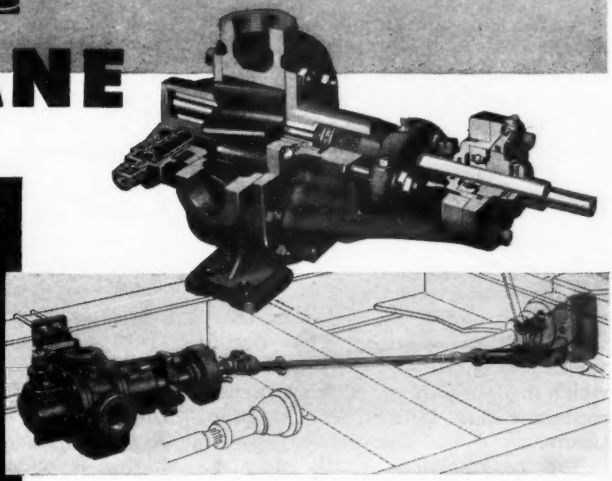
Crown's city trucks operate an average of 300 days a year, traveling about 75 miles per day. In a year they average around 23,000 miles. It is the practice of the company to put a new set of rings in the trucks every year; every two years, grind the valves; and at the end of 300,000 to 350,000 miles re-bore the motor. Records show that wear on the motors is at a minimum. At the end of 300,000 miles the Dodges show cylinder taper of less than .0012; the Brockways less than .0010.

Drivers for the fleet are unanimous in their praise of butane. They report that their trucks run smoother, are cooler than on gasoline operation and that they definitely have more power for starting and on long grades. This increase in power is as much as one gear.

PLANT FACILITIES: The Crown company maintains and operates its own butane pumping station at its plant. Fuel is pumped through a vacuum pumping system using two hoses, one a liquid and one a vapor return line. Although this system is considerably more trouble than other types in use, it is claimed that it prevents overfilling of truck tanks. Storage facilities consist of one 4400 gal. underground tank, and 3000 gal. of fuel is pumped into it every two weeks.

Easy to Install

ROPER TRUCK PUMP for BUTANE



FEATURES

OVERSIZE BEARINGS
high lead bronze.

SELF-LUBRICATING
ample lubricating qualities in bearing metal.

EXTRA LONG PACKING BOX
special packing rings best for butane.

2 PIECE BRONZE STUFFING GLAND
easily repacked.

STAINLESS STEEL DRIVE SHAFT
can't corrode.

BUILT-IN OUTBOARD BEARING
sealed against dust and dirt.

PUMPING GEARS
quiet spiral tooth design.

BUILT-IN RELIEF VALVE
(optional) protection against clogging or closed discharge line.

Here you can see how the compact Roper, Fig. 3600 HBRV is designed to fit the cramped space available on modern tank trucks. It is driven by power take-off through drive shaft and universal joints. Can be mounted on side frame (as illustrated) or in cradle.

This rugged truck pump is designed and built to deliver large capacity at low cost. Unusually quiet in operation. Capacities up to 90 G.P.M. at 560 R.P.M.

GET ALL THE FACTS IN FREE BULLETIN No. 7-57
Individual parts illustrated and described in detail, cutaway views showing construction, dimensional drawings and helpful data.

Field Offices in Principal Cities

GEO. D. ROPER CORP., ROCKFORD, ILL.

PUMPS ESPECIALLY ENGINEERED TO FIT YOUR REQUIREMENTS

ROPER *Rotary Pumps*

BUILDERS OF PUMPS FOR MANUFACTURING, MARINE, PETROLEUM, AND PROCESS INDUSTRIES

New Products

Remote Control

A flexible connection which will permit the opening and closing of master valves located in inaccessible places in and around LP-Gas containers, especially truck tanks, has been developed by The Bastian-Blessing Co., Chicago.

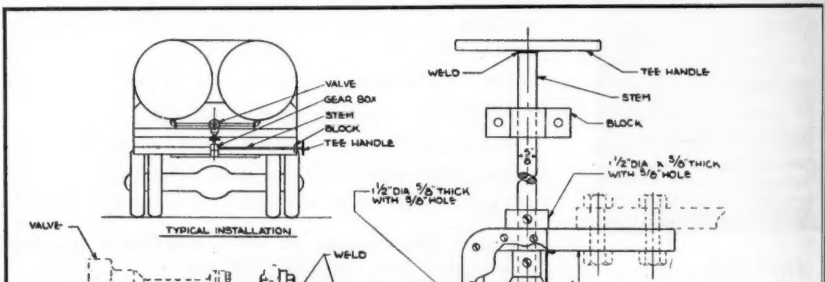
Because of the multiplicity of tank designs, The Bastian-Blessing Co. has decided that it is not practical to be manufactured on a production basis and the company is therefore offering to members of the LP-Gas industry the privilege of using this design for fabrication on individual jobs which dealers may order from various container and tank truck manufacturers.

The construction details may be taken from the accompanying drawing (No. 10934) which presents a simple and efficient solution to the problem of operating master valves in inaccessible places. This control is adaptable to any installation and can be made easily of parts available locally. It is important that the sheet metal gear housing be made dust proof and so arranged as to permit it being filled with a proper grease.

Highest Bid Takes Surplus Property Up to $5000

In order to speed up the sale of surplus war goods, the Office of Surplus Property of the Department of Commerce has modified its sales procedures and given its eleven regional offices greater latitude in their operations.

Whereas formerly it was required that property with a total acquisition cost of $1000 be listed in the Surplus Reporter, effective immediately such listing is necessary only in the case of items of a significant amount. In


VALVE
GEAR BOX
STEM
BLOCK
TEE HANDLE
TYPICAL INSTALLATION
WELD
TEE HANDLE
STEM
BLOCK
1½" DIA x 5/8" THICK WITH 5/8" HOLE
1½" DIA 5/8" THICK WITH 5/8" HOLE
VALVE
WELD
SHEET METAL HOUSING
USE 7"x4" x 5/16" x 22" STRUCTURAL ANGLE 3¼" WIDE OR USE 5/8" THICK STEEL PLATE AND WELD TO MAKE AN ANGLE
PLUG WITH ½" SQ HOLE THRU
FOR DIAMENSIONS SHOWN BOSTON GEARS #PA-3212 CAN BE USED. WE SUGGEST USING A, 2-1 RATIO SET OF GEARS
FILE 5/8" DIA ROD TO ½" SQ APPROX 1½" LONG
3" DIA x ¼" THICK STEEL PLATE
1" PIPE 2" LONG

Allow .010" for secondary operations unless otherwise specified.

NOW LINKED for Strength and Service

To "PAYNEHEAT'S" 30 years' specialized experience and nationwide reputation for fine furnaces are now added the great resources and technical facilities of Dresser Industries, Inc. ★ Thus, sales horizons are widened, postwar opportunities enlarged for PAYNE representatives everywhere. And they will have, as an added, *exclusive* sales stimulant: ZONE-CONDITIONING.

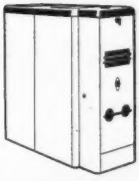
PAYNE ZONE-CONDITIONING

Circulated winter warmth, cooling summer ventilation, *controlled by zones, rooms or apartments* . . . successor to old-fashioned central heating!

PAYNE FURNACE COMPANY

(One of the DRESSER Industries)

BEVERLY HILLS, CALIFORNIA



PAYNE "ZONEAIR"

Compact, streamlined, efficient. Distinguished by exclusive engineering features.

Request FREE booklet

PAYNEHEAT

OVER 30 YEARS OF LEADERSHIP

GAS FUEL (HAS) EVERYTHING

general, this means that property having a value of $5000 or less and which can be absorbed in the regional market will not be advertised in the Surplus Reporter but will be offered by special listings as soon as it is ready for sale. Wide-spread publicity of offerings will still be the rule.

Regional directors have been told that as a rule-of-thumb they should regard the highest bid offered as the market value of the property. In other words the high bid will generally be accepted, assuming that there has been proper circularization of the offering.

Steel, Copper Restrictions Lifted for Construction

Restrictions on the use of steel, copper and electrical materials in construction work specifically authorized by the War Production Board subject to Schedule A to Controlled Materials Plan Regulation 6 (Construction Limitations) have been eliminated by an amendment to that schedule, WPB reported June 4.

Builders who have previously received Form-GA-1456 authorizations may now take advantage of these changes.

Provisions of Appendix II of this schedule on the use of ratings for equipment have been modified. With the exception of oil-fired equipment and natural gas-fired equipment, any equipment that can be obtained without a rating may now be installed under the project authorization. However, in general, the rating may not be used to get equipment that is not listed and approved. These changes in Appendix II do not apply to authorizations issued before the date of issuance of today's amendment.

FOR LOCAL TRANSPORT SERVICE

Today, more than ever, the conservation of gasoline and tires is of utmost importance. The extreme care and consideration given these two vital facts by American Engineers in the design of transport units have resulted in proper load distribution at all times, thus enabling the operator to receive maximum gasoline mileage and longer tire wear.

American High Pressure Transport Tanks are made under API and ASME Codes and equipped with all accepted safety features. Be sure you specify American when you buy.

AMERICAN

PIPE & STEEL CORPORATION

Manufacturers and Distributors
Alhambra, California

Tomorrow's Kitchen is Beautiful...it's Yours ..... it's *GAS*

No one thing . . . no one place in the homes of America holds as much interest for housewives—young or old—as the kitchen. Tens of thousands of women are anxiously looking forward to their opportunity to improve in part or completely their "work-shop". Everything they seek can be found in a

NEW FREEDOM GAS KITCHEN

KITCHEN DESIGN OWNED BY
CRIBBEN & SEXTON COMPANY
UNIVERSAL *GAS* RANGES

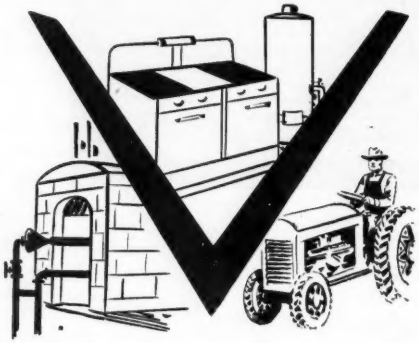
To help you meet this need for information . . . to provide helpful suggestions . . . to aid you and your customers translate desire, from ideas into action . . . UNIVERSAL has developed not one, but several NEW FREEDOM GAS KITCHEN DESIGNS.

Send for your free copy of the "Tomorrow's Kitchen IS Beautiful" Plan Book, describing the promotional material available for your use in this timely program.

UNIVERSAL GAS RANGES

CRIBBEN & SEXTON COMPANY
CHICAGO 12, ILLINOIS

Keep the Home Fires Burning For Victory



WITH

SINCLAIR LP-GASES

Keeping the home fires burning is more than sentiment and patriotism. Victory depends upon an adequate supply of efficient, dependable heat and power for the production line; for welding torch and annealing oven . . . high octane aviation gasoline for flying fortresses . . .fuel for well-cooked meals on the home, farm and defense front.

Sinclair LP-Gases are serving in many important places, at home and abroad . . . on fighting front . . . in family kitchen.

Sinclair Butane and Propane will be more important to Sinclair distributors in the post-war period.

SINCLAIR PRAIRIE OIL COMPANY

Liquefied Petroleum Gas Division

Sinclair Bldg. Tulsa, Oklahoma

ANSWERS

To Questions on NBFU—58 on Pages 46-51

(1) In volume not over 1/5th lower limit of combustibility.

(2) Underwriters' Laboratories.*

(3) Against the side of building.

(4) Material resistant to solvent action of propane.

(5) Heavy walled seamless brass or copper tubing.

(6) Not greater than 3/32 in.

(7) On either high or low pressure side.

(8) Well supported and protected against mechanical injury.

(9) Designed for bursting pressure five times the maximum working pressure of system.

(10) To prevent building up pressures in excess of 120% of the maximum permitted setting of safety relief valves on the container.

(11) Have direct communication with vapor space in container.

(12) The vaporizer is located outside of the house.

(13) Liquid pump.

(14) With valve closed.

(15) Installed aboveground.

(16) So the discharge from the safety relief valve is 5 ft. away from any building opening which is below the level of such discharge.

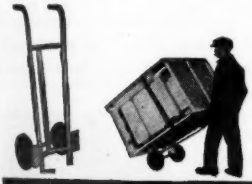
(17) By properly designed ventilated cap or collar fastened to the container capable of withstanding

*** To avoid confusion, it must be remembered this is a quiz on the rules of the National Board of Fire Underwriters. Where statutes and ICC laws are effective, they must be observed, also.—Editor.**

OUR 60th YEAR
OF DEPENDABLE SERVICE

DESIGNERS and
FABRICATORS of
A COMPLETE "MOSCO" LINE
OF LP-GAS CONTAINERS

MOSHER STEEL CO.
DALLAS HOUSTON TYLER



Gas Cylinder Truck —
Easy Handling — Saves Lawns

- ALSO FOR STOVES, BOXES, CRATES
- PNEUMATIC RUBBER TIRES AVAILABLE NOW

An all purpose, one man truck for moving both cylinders and appliances. No more back-breaking lifting, either. Tapered body gives operator ample room between handles. Cradle construction accommodates any size cylinder up to 100 pound capacity. Wide Bottom flanges give support for appliances. Web strap (optional) holds appliance rigidly. Rounded handle grips permit skidding from end of delivery truck. Time saving, labor saving, cost cutting. Available now.

Write for prices and folder.

THOMAS
TRUCK
& CASTER
COMPANY
700 Mississippi River, Keokuk, Ia.

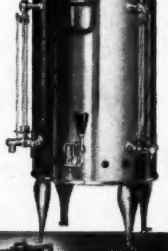
GOOD NEWS!

New Coffee Urns and Steam Tables are now available to help build your LP-gas load

● Once again you'll be able to build customer good-will with these BLICKMAN appliances, designed especially for use with butane-propane. These important load-builders are now available because of the easing of restrictions on the use of stainless steel and copper. If you want increased sales and profits, write for quotations and complete information.

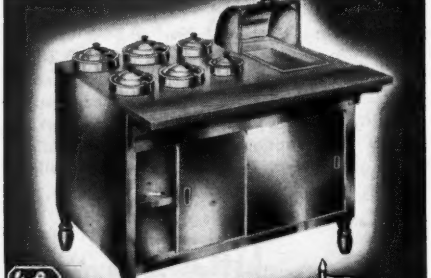
COFFEE URNS

A wide selection of single urns, twin urns, two-piece and three-piece batteries — including the finest stainless steel urns. Catalogs on request.



STEAM TABLES

Models available with open or fully-enclosed understructures.



S. BLICKMAN, INC.

Manufacturers of Food Service Equipment

2107 Gregory Ave. • WEEHAWKEN, N. J.

blows from any direction equivalent to a 30 lb. weight dropped 4 ft.

(18) On all Interstate Commerce Commission containers designed for handling liquefied petroleum gases.

(19) If they have been tested in accordance with currently effective ICC regulations.

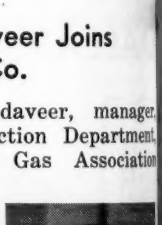
(20) If they withstand hydrostatic retests at the pressure specified for the original hydrostatic test as required by the code under which constructed.

(21) Underground containers of 400 lbs. capacity must be installed 10 ft. from any building or property line and not less than 2 ft. below the surface of the ground.

(22) Compressed inflammable liquids.

Dr. F. E. Vandaveer Joins East Ohio Gas Co.

Dr. F. E. Vandaveer, manager, Testing and Inspection Department, of the American Gas Association Testing Laboratories, resigned May 31 to join the staff of The East Ohio Gas Co. In his new affiliation, Dr. Vandaveer will assume responsibilities formerly handled by the late Charles F. Turner, chief chemist of this company, with headquarters in Cleveland.



F. E. VANDAVEER

Dr. Vandaveer has been associated with the Laboratories for the past 2[illegible] years. Next to Mr. R. M. Conner, he was the Laboratories oldest employee in time of service, joining the staff shortly after their establishment in

WHAT SIZE AREA

CAN YOU HEAT WITH REZNOR UNIT HEATERS ?

ANY SIZE . . .

A storeroom, restaurant, bowling alley, church, auditorium, factory . . . you can heat any size area with Reznor Gas-Fired Unit Heaters.

Reznor makes 3 styles of heaters—fan, duct, and blower, and has 9 sizes of each style, ranging in input from 55,000 to 400,000 B. T. U. per hour.

The proper size, style, and number of heaters depend upon the cubic feet in the area to be heated. As an example, the Navy's 2000 bed, 23 ward Fleet Hospital in San Francisco has more than 100 Reznor US 110 Fan Type Unit Heaters.

Regardless of area, Reznor Gas-Fired Unit Heaters provide clean, comfortable, automatic heat, which turns on or off as heat is needed. With Reznor, you pay *only* for the heat you use, and you have heat where and when you want it.

Send for the Reznor catalog or ask for the name of the Reznor representative nearest you.

REZNOR MANUFACTURING CO.

REZNOR

201 JAMES STREET
MERCER, PENNA.

"GAS HEATERS EXCLUSIVELY SINCE 1888"

CITY CONVENIENCES GO TO THE COUNTRY

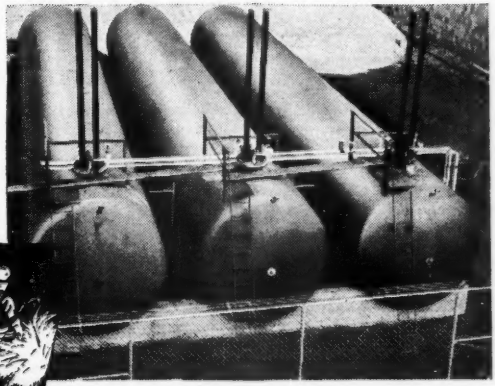
. . . LP-Gas Industry to Expand Domestic Service

The post-war demand will necessitate an EXPANDED LP-Gas service. Downingtown is prepared to supply the necessary bulk storage tanks for surface or underground installation. Our manufacturing experience and engineering consultation will be of advantage to you in making a wise choice before placing an order.

Mr. and Mrs. America are planning today for the homes they will live in tomorrow. "City" gas will be a long time reaching some areas . . . it may never reach certain localities where the building of many new dwellings is now contemplated.

There is a wonderful opportunity for the LP-Gas industry in these areas . . . people leaving the city to enjoy fresh, country air, need not give up city conveniences . . . more than 2,000,000 homes today depend upon LP-Gas service for cooking, heating, refrigerating and hot water supply.

We will be glad to have the opportunity to discuss with distributors of LP-Gas Service plans and specifications for specific jobs. Write us today.



DOWNINGTOWN IRON WORKS
DOWNINGTOWN, PA.
WELDED and RIVETED PRODUCTS

1925. At one time or another he headed every department of the Laboratories including testing, research and war work. 1933 to 1937 he was located in Los Angeles in charge of the West Coast Branch.

Appliance testing activities previously headed by Dr. Vandaveer will be supervised by K. H. Flint, who has been with the Laboratories for more than 19 years.

Requirements For High Altitude Approval Adopted by ASA

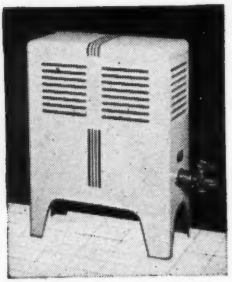
Special high altitude approval requirements for gas appliances designated for use at altitudes above 2000 feet have been adopted by the Approval Requirements Committee, a sectional committee, of the American Standards Association. The new requirements became effective imme diately following their adoption Apr 13 and are expected to be accepte by the American Standards Associa tion in the near future as "Americ Standard."

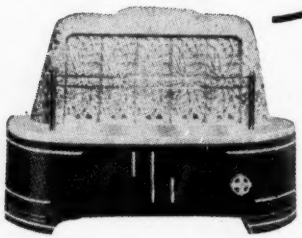
The American Gas Associatio Testing Laboratories are prepared t test ranges, space heaters, centra heating appliances, and water hea ers under the new requirements im mediately, these being the classes o appliances affected by the action.

Generally speaking, the new re quirements cover gas equipment op erating on all gases including liqu fied petroleum and butane-air. Sp cific tests are provided for combus tion as well as for performance o main and pilot burners and draf hoods. High altitude is defined as an elevation between 2000 and 5200 ft.

Armstrong

QUALITY SINCE 1899



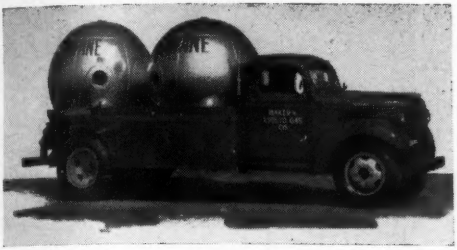


No. 10-C Bathroom Heater —1-pc. body finished in white porcelain enamel. Cast iron burner, adjustable air mixers. 14½" high.
No. 690 Radiant Heater (center) — Finished in brown vitreous enamel. 17¾" high. 20,000 or 24,000 B.T.U.

Although our plant is devoted largely to war production, we still make some gas heaters. Deliveries to both old and new customers on a quota basis.

ARMSTRONG PRODUCTS CORP.
DEPT. BP HUNTINGTON, W. VIRGINIA

No. 900 Circulati Radiant Heater— signed for proper c bustion to produce radiant and circula heat. Brown porce enamel finish. 19" 18,000 or 28,000 B.T



PROPANE-DELIVERY

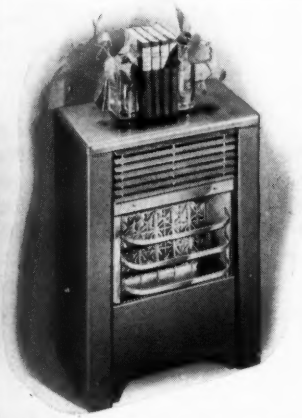
FOR SERVICE
FOR ECONOMY
FOR APPEARANCE

A COMPLETE 1500 net gal. unit built for Bakern Liquid Gas Co. including spheres, piping, pumps, skirting, painting, etc.

Information on your particular needs, for transportation or storage, can be obtained by writing or calling

Superior Tank & Construction Co.

6155 SOUTH EASTERN AVENUE, LOS ANGELES, CALIFORNIA
PHONE ANgelus 4157



DEARBORN

WORLD'S FINEST...SAFEST

L.P.G. GAS HEATERS

A complete line of Vented and Unvented Quality heaters. Their Ultra Smart Appearance, Outstanding L.P.G. Performance and many Exclusive Features create unprecedented user enthusiasm. You are assured satisfied customers and decidedly lower service costs when you sell this fine line.

BUT. PRO. MIX. NAT. MFG. GAS.

FAMOUS HI-CROWN BURNER

BLUE FLAME PILOT LIGHT

Leading L.P.G. Distributors from coast to coast rate it the finest of all burners for Butane. It "performs" without coaxing, constant cleaning or adjusting. Its quiet, odorless operation, great flexibility and reserve capacity insures your customers being completely satisfied.

FEATURES THAT SELL

A.G.A. Approval, Hi-Crown Burners, Automatic Lighting, Syphonaire Chassis, and Air Insulated Cabinets are features your customers want. Finer —Safer heaters, yet priced unbelievably LOW. Write for literature.

DEARBORN STOVE CO.

3256 Milwaukee Ave.
CHICAGO, ILL.

3625 S. Grand Ave.
LOS ANGELES, CALIF.

PROPANE—New facilities will permit CITIES SERVICE to offer the LPG trade substantially larger volumes of PROPANE in 1945.

•

CITIES SERVICE experience in the LPG business covers a period of over 15 years. To the LPG distributor seeking a dependable source, CITIES SERVICE therefore offers attractive opportunities.

•

In LPG as well as in so many other fields—

CITIES SERVICE
means
GOOD SERVICE

CITIES SERVICE OIL CO. (Del.)

Bartlesville, Okla.

•

Other Sales Offices:
CHICAGO, CLEVELAND, KANSAS CITY, ST. PAUL, TORONTO

Consumers Favor Gas, Survey Shows

INTERESTING data for the g industry is found in the detail survey just released by the Woman Home Companion magazine for hous makers, and abstracted by the Ge D. Roper Corp.

A psychological survey in rega to homemaking and appliances by t research department of Crowell-Co lier Publishing Co. digests the resul of studies by Dr. Ernest Dichter. H found three distinct and basic type of women and identified them as 51 the true housewife, whose interes are monopolized by her home; 11 career women (or potential care women) who hate housework; an 31% balanced homemakers who enjoy both housework and outside work, and are capable of doing both.

A national sample of 2,467 hom makers throughout the nation was ob tained by personal interview. A que tionnaire was then mailed to th Woman's Home Companion panel of 2,000 reader-reporters. Both group were carefully diversified by geo graphical area, size of city, incom marital status, age groups, psycho ogical types.

Some 39% of the national samp was obtained in cities under 10,0 inhabitants. It was determined in thi group that 61% used gas ranges, 18 electric and that 33% will buy a ne range when appliances become ava able.

Improvements wanted were ov clock control 76%, automatic ov lighting 64%, "Simmer-Speed" bur ers 53%, rounded oven corners an seams 48%, giant burner or unit 18

THE BOTTLED GAS MANUAL

A field guide and text book for dealers, salesmen and servicemen

352 Pages of Answers to Every Day Questions About Liquefied Gases, Appliances and Equipment

These Are the Chapter Headings

What Is Propane?
The Behavior of Gases
Heat and Temperature
What Goes On Within a Propane Cylinder?
The Simple Regulator
Regulator Manifolds
Regulations—Equipment Selection and Installation
LP-Gas Pipe Lines
Testing for Leaks and Adjusting Burners
Fundamentals of Thermostats
Pilots and Pilot Controls
Burner Design and Application
Appliance Conversions
Facts About Water and Water Heaters
Types of Water Heaters
Selecting and Installing the Water Heater
Competitive Fuels—Wood
Competitive Fuels—Coal
Competitive Fuels—Oil
Competitive Fuels—Electricity—Rates and Refrigeration
Competitive Fuels—Electricity—Cooking and Water Heating
Gas Lighting
Space Heating
The Tools of Our Profession

We pay postage on orders accompanied by check or money order. In California add 10c for sales tax. In Canada add 40c for excise tax.

MAIL ORDER TODAY

BUTANE-PROPANE News, Publishers
1709 West 8th Street, Los Angeles 14, Calif.

SPECIAL OFFER
25% Discount on All Orders of 10 or More.

$4.00 per copy

Gentlemen: Please send me.....copies of The Bottled Gas Manual for which I am enclosing check (or money order) for $.....

Name .....Position.....

Company.....

Address.....City and State.....

When Regulations Revoked, WPB May Still Require Reports

When a War Production Board order or regulation has been revoked, WPB may require that reports called for by the revoked document be continued, the board announced in amending Priorities Regulation 8.

The amended PR-8 provides that when an order or regulation is revoked, WPB may continue the reporting requirement upon written notice in one of the following ways:

(1) A letter or other written instrument specifically addressed, countersigned by the recording secretary or pursuant to WPB Regulation No. 1.

(2) A report form or instruction sheet bearing an official WPB number and specifically addressed.

Bureau of the Budget approval will be indicated on all reporting forms and instructions, with the approval number and usually the expiration date. Where no special form is used, the order, regulation or letter will indicate Bureau of the Budget approval.

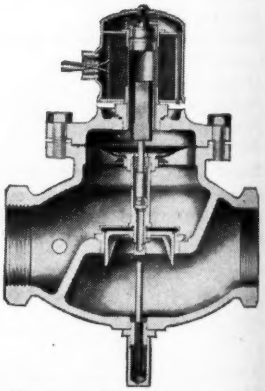
Failure to file a required report is a violation of PR-8 and of any other order or regulation which requires it, the amended regulation says. It points out that many safeguards, including Bureau of Budget approval, exist to insure that the information requested in reports is fully needed.

It defines "reports" as any information that must be filed with WPB under specified conditions, but excludes information required in connection with applications for priorities assistance, for specific authorization, or for relief from the provisions of orders and regulations.

General Controls

K-3-B MAGNETIC GAS VALVE

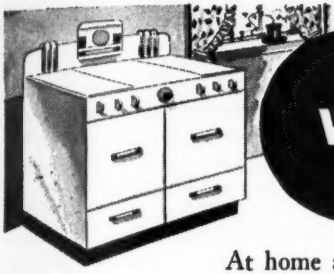
Universally accepted by industry for its quiet, positive and trouble-free operation. Unusually low current consumption for all voltages and frequencies, A.C. or D.C. Two-wire, current failure, packless design, rotatable electric outlet, even pressure pilot connections, manual opening for easy installation. Available in widest range of sizes, 3/8" to 6" I.P.S.



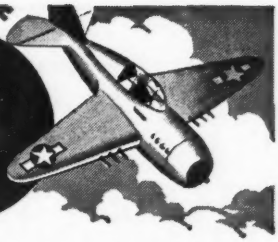
For operating pressures up to 5 pounds, natural, manufactured or LP Gas.

GENERAL CONTROLS
801 ALLEN AVENUE GLENDALE 1, CALIF.

FACTORY BRANCHES: PHILADELPHIA • ATLANTA • BOSTON • CHICAGO • DALLAS
KANSAS CITY • NEW YORK • DENVER • DETROIT • CLEVELAND • PITTSBURGH
HOUSTON • SEATTLE • SAN FRANCISCO • DISTRIBUTORS IN PRINCIPAL CITIES



IN WAR OR PEACE



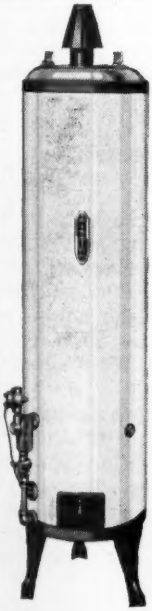
At home and on the industrial front, a dependable source of Butane and Propane means more satisfied customers. For more than fifty years, through wars and in peace times, Carter has faithfully served. Write us for higher quality Butane and Propane.

The CARTER Oil Company

DEHYDRATED PROPANE • BUTANE

WHOLESALE ONLY

TULSA, OKLAHOMA



"PRIDE OF OWNERSHIP"

This phrase is known to all; in simple words, it expresses that possessive something within us that joys in the good and useful things we own.

The Mission Plant is constantly on the alert to increase pride of ownership of a Mission Water Heater.

. . . 100% Safety Control Valves . . . LP-Gas Bunsen Type Burner . . . Thermostatically controlled temperature.

Deliveries will be made as fast as production permits.

"More hot water per minute at less cost."

MISSION WATER HEATER COMPANY

HEADQUARTERS: 7101 McKinley Ave., Los Angeles 1
BRANCHES: Oakland, 6601 Beck St.; San Francisco, 3369 Mission St.

A Name
That Stands
for Quality

McNAMAR

Tanks for
most all L.P.G.
requirements

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McNAMAR
Boiler and Tank Co.

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SAVE
★ **ERRORS**
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★ **EQUIPMENT**

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59 E. Van Buren, Chicago • 302 South Pearl St., Dallas, Texas
Representatives and Stocks in All Principal Cities

Adel Will Publish Automotive Filling Station Directory

A "National Listing of Butane-Propane Automotive Filling Stations" will soon be available to anyone desiring a copy. This pocket-sized phamplet, to be distributed free by the Adel Precision Products Co., 10777 Van Owen St., Burbank, Calif., will be off the presses and ready for distribution by July 15. Anyone desiring one or more copies may write direct to Adel or contact the offices of BUTANE-PROPANE *News* in Los Angeles.

The directory will contain the names and addresses of all known stations in the United States. These will be listed alphabetically according to towns and states. The book will have a hard cover, punched at the corner, permitting it to be hung in the cab of a truck.

The management of Adel also states that the directory will contain a return, self-addressed, prepaid postcard which will ask the recipient for "additional listings" or "corrections" in order that the list be kept up-to-date at all times.

Many Important Items Still in Short Supply

A list of 101 items and groups of items that are now or are expected to be in short supply has been submitted to the War Production Board in the first report of the newly appointed Joint Committee for Critical Material and Products, WBP reported June 16.

These are the items, the committee reported, that might bottleneck war-supporting programs or civilian programs of high urgency. Among the number are temperature and combustion controls, internal combustion engines, Neoprene, and sheet and strip steel.

New Texas Law Intended To Help B-P Gas Industry

A bill to put more safeguards around the transportation, handling and use of butane gas became law in Texas June 18.

The measure may have conflicting sections, the governor said, but he believes there is sufficient provisions to protect the public even should some sections be held invalid.

The bill strengthens the Railroad Commission's power to regulate butane appliances, equipment, installations and servicing.

Field Offices Can't Assign Preference Ratings

Field offices of WPB have been instructed not to assign preference ratings or make allotments of controlled materials under Priorities Regulation 25 beyond July 1, 1945, WPB has announced. (WPB-8288)

Revocation of Order L-185 Increases Water Heaters

Revocation of the limitation order (L-185) that controlled production of water heaters was reported by WPB.

This action is expected to result in a slight increase in the number of heaters available for civilian purchase this year, WPB officials said.

Tank Car Demurrage Order Suspended June 15

Revised Service Order 263, Amendment 6, covering demurrage charges on tank cars, has been suspended.

The effective date was June 15.

BULK PLANTS 100 LB.—W.P. ANY SIZE

ASME

BULK PLANTS 125 LB.—W.P. ANY SIZE

ASME

BULK PLANTS 200 LB.—W.P. ANY SIZE

WE HAVE MATERIAL AND FITTINGS TO COMPLETE SEVERAL LARGE STORAGE VESSELS

LET US ASSIST YOU IN FILING WITH W.P.B. AND P.A.W. FOR APPROVAL

DON'T WAIT UNTIL YOU MUST HAVE THE STORAGE. APPLY NOW.

IF YOU ANTICIPATE PURCHASING A BULK PLANT ANY TIME BETWEEN NOW AND THE WINTER OF 1945, CONTACT

DELTA TANK MANUFACTURING CO.

BATON ROUGE, LOUISIANA

Manpower Order Relaxed Outside of Groups I and II

Requirements of Priorities Regulation 16 (Appeals Procedure) for manpower information on Form WPB-3820 have been relaxed by eliminating the necessity for filing this form with an appeal in any case where production will take place outside Group I or Group II labor areas or in establishments where the total number of production workers will be 100 or less, the War Production Board reported June 12.

Revision of L-23c Suggested By Industry to WPB

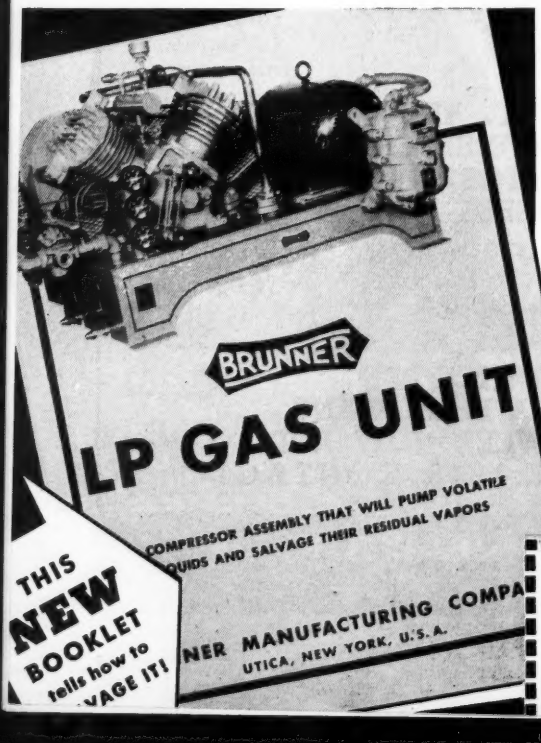
Immediate revision of L-23c has been recommended by the Domestic Cooking Appliance and Heating Stove IAC, WPB reports. Members also recommended elimination of rationing and substitution of distribution controls through certification of need for new equipment at the consumer-dealer level.

Non-electric cooking stoves, totaling 567,409, and 637,506 non-electric heating stoves were produced in the first quarter.

J. C. Myers Adds Propane To Barstow, Calif., Storage

The installation of a new 3000-gal. propane storage tank has been announced by J. C. Myers, president of Butane, Ltd. The storage tank is located at the Butane, Ltd., plant, 1½ miles east of Barstow, Calif., on Highway 91.

This company also has a similar tank for butane gas, allowing them to mix gas in any desired proportions for any use.



Save from 500 to 1000 lbs. of LP Gas Vap from each Tank Car

Conservation of petroleum products is a n necessity. The vapor left in the tank after liq petroleum has been transferred from a tank or truck equals from 500 to 1000 lbs. of LP G This booklet... probably the most compre sive ever prepared... tells how this vapor be salvaged with the Brunner LP Gas Unit. unit for gas transfer and recovery is outst ing in speed, efficiency and low cost. The ings in gas alone will pay for the unit af few unloadings. In addition, the time req for unloading is greatly reduced. Brunner ufacturing Company, Utica, N. Y., U. S. A.

Mail This Coupon TODAY!

Brunner Manufacturing Company, Utica, N. Y., U. S. A.
Send me the booklet describing the Brunner LP G and containing diagrams, tables and valuable tion on the handling of liquid petroleum gas.

Name_____

Address_____

Wait!

for LP-Gas Carburetion by DIX

In the expansion period after the war, when the automotive industry will be looking for something "new" in butane-propane power, your best bet will be DIX LP-Gas Carburetion Unit. It will pay to WAIT for something NEW.

Han probado ustedes BUTANE como combustible? En caso que no, escribanos.

DIX MANUFACTURING CO.

3447 E. Pico Blvd. Los Angeles 23, Calif.
Export Office—80 Broad St.,
New York City 4

Bottled Gas
CABINETS

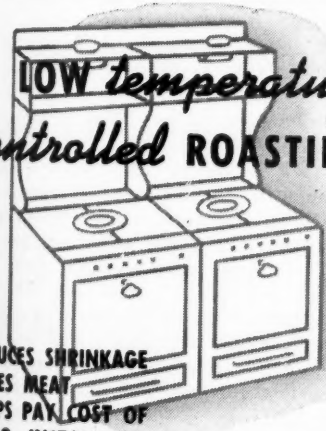
Hood-type as well as full size. Well built of heavy metal with protective coating of paint, or galvanized. Thousands of installations giving satisfactory service. Write for details and prices.

Liquid Propane Vaporizer

Installs OUTSIDE tank. Always accessible. Insures vaporized gas in any weather. Write for details and price.

The Oxford Company

Oxford Pennsylvania



LOW temperature controlled ROASTING

REDUCES SHRINKAGE
SAVES MEAT
HELPS PAY COST OF
L.P.G. INSTALLATIONS

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THERMOSTAT COMPANY
Youngwood, Pa.
COMMERCIAL & INDUSTRIAL DIVISION

Write for Information on Post War Delivery of

Utility

GAS SYSTEMS

Quotations on any type or size pressure vessel to meet your specifications.

We specialize in truck and transport tanks.

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Butane Equipment Co., Inc.

Box 1451

DALLAS TEXAS

With the demands of War placing new responsibilities on Viking Pumps, coupled with Viking's largest selection of Rotary Pumps in the world, the net result has been a wider and still wider application for Vikings.

Take advantage of this wealth of experience. If you have a rotary pumping problem, ask Viking about it today.

Write for Special Folder SP-123b which illustrates many styles and sizes available, as well as listing and describing 30 special bulletins, any of which will be sent to you free on request.

★

VIKING PUMP COMPANY
CEDAR FALLS, IOWA

Home Building Activities Mean More B-P Gas Installations

About a year and a half ago in a small city in the northwest, a lumber dealer, a real estate dealer, a banker and a few others, had the inspiration to invite all of the prospective postwar home builders in their community to a series of talks and discussions about postwar building. These were so successful that similar "Institutes" were held in other parts of the country. In fact, they became so important that the idea was picked up by the National Retail Lumber Dealers Association which is now coordinating and organizing "Home Planners' Institutes" on a national basis.

These facts are released to the B-P Gas industry through Frier McCollister, of the Lawrence H. Selz Organization, Chicago, publicity counsel for the Liquefied Petroleum Gas Association.

A folder has been published by the lumber dealers' organization which describes the Institute idea in detail as it is now developed, and a manual is available consisting of a 24-page handbook, an index to lectures and 32 lectures covering as many subjects related to home building. Also included in the manual is promotional material to assist local committees in organizing their own Institutes.

The Selz Organization has prepared a lecture written on B-P Gas, the country water system and a home sewage disposal system. By "packaging" these three important items our industry will gain because water, sewage and gas are three vital factors which must be taken into consideration by the family which plans to build in the country.

The Home Planners' Institute is an activity in which all B-P Gas distributors can cooperate to great advantage, states Mr. McCollister.

The New, Modern

ROYAL ROSE GAS RANGE

Beautifully streamlined, sturdy steel construction, all white porcelain finish. Designed for superior performance in tomorrow's kitchen.

Write for Details

J. ROSE & CO., INC.

68 Jay Street Brooklyn 1, N. Y.

LIQUID GAS EQUIPMENT CORP.

Distributors of:

CYLINDERS
TANKS
RANGES
SPACE HEATERS
WATER HEATERS
FLOOR FURNACES
PUMPS
METERS
REGULATORS
FITTINGS

1355 Market Street

SAN FRANCISCO 3, CALIFORNIA

BUEHLER

Tank and Welding Works

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Manufacturers of Tanks, Welded and Pressed Steel Products

•

5000 Pacific Boulevard

LOS ANGELES 11, CALIFORNIA

KEEP TUNED TO BRILLIANT FIRE LP-GAS HEATERS IN 1945

Write for Latest Bulletin

THE OHIO FOUNDRY & MFG. CO.

STEUBENVILLE, OHIO

"Quality Heating Equipment Since 1846"

BRILLIANT FIRE

Brilliant Fire

GAS CIRCULATOR

NATURAL • MANUFACTURED • BUTANE • PROPANE

Keep Temperature Right for Turkey Brooding Room

It takes a lot of care and patience to bring along a turkey to the right age for the best market price. Poults are very susceptible to colds, drafts, and changes in temperature. For this reason, growers do not recirculate air in the brooding room for fear of spreading disease germs.

Out in Liberty, Mo., according to the "Reznor News," Miller's Turkey Ranch looked into the matter of heating and finally decided to install Reznor unit heaters. Air is supplied at the floor through double diffusion registers and heated air is supplied constantly during the heating season.

The air is exhausted through a ceiling duct powered with a blower fan which is wired in series with one of the SB 75 unit heaters. To maintain a positive pressure on the room, less air is exhausted than is supplied.

Even though the outside temperature may drop to as low as 15° below zero, the SB 75 and S-150-D Reznor heaters have sufficient Btu. capacity for heating all the outside air necessary.

Here are the details of the heating cycle as supplied by C. V. Werner of H. H. Wright Co., 1322 Walnut St., Kansas City, Mo., Reznor representatives.

"When the disconnect switch is engaged, the SB 75 blower and the exhaust blower circulate air to and from the brooder's room.

"If the SB 75 unit is drawing in 40° outside air and the brooder room unit is satisfied, air stats No. 6 and No. 7 will turn on the two-stage gas valve since they are set for 50° and 60°.

"When the air leaving the S-150-D

when you think of L.P. Gases think of

Standard FLAMO . . . Sold in cylinders for Industrial, Commercial and Domestic uses.

Standard PRO-GAS and BU-GAS . . . delivered in bulk through Standard of California Distributors.

CALOL INDUSTRIAL GAS No. 1 . . . Supplied to gas companies for use in manufacture of gas distributed through gas mains.

STANDARD OF CALIFORNIA

Top Performance!

ACME — NATURAL GAS — BUTANE — PROPANE — CARBURETION

BUTANE-PROPANE EQUIPMENT

Fill your L-P Gas needs now . . . with equipment engineered for top performance and efficiency. Consult us about your particular problems.

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ALSO SEE US FOR . . .
PUMPS METERS HOSE VALVES
REGULATORS FITTINGS

ACME EQUIPMENT CORP.
Butane

313-317 So. Pearl St.
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For Safety and Economy

ETHYL MERCAPTAN

—Purified—

The ACCEPTED standard odorant for liquefied petroleum gases.

MALLINCKRODT CHEMICAL WORKS

ST. LOUIS NEW YORK

You Can Count on

UNITED STATES HEATER CO.

Water Heaters
For Every Need

Automatic— Dependable—

A.G.A. APPROVED

UNITED STATES HEATER CO.
COMPTON, CALIFORNIA

Distributors for

REGO
LP GAS EQUIPMENT

Hackney
BUTANE-PROPANE CYLINDERS

L.C. RONEY INC.

GAS EQUIPMENT CO., INC.
2620 South Ervay Street, Dallas, Texas
GAS EQUIPMENT SUPPLY CO.

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Classified advertising is set in 6-point type, without border or display, at the rate of 10 cents per word per insertion; minimum charge per insertion $2. Box numbers for replies count as 5 words. Count as a word each one letter word and each group of figures. Classified advertising is only accepted when payment accompanies order. Copy and payment must reach publisher's office prior to 10th of month preceding publication.

SITUATIONS WANTED

SITUATION WANTED: CONSULTING Engineer & Sales Mgr., with 5 years L.P.G. record, desires connections with reliable Company, who needs the services of a competent, reliable, trustworthy and sober Executive; Capable of training a new Sales Force in new fields. Prefer South or East. Write Box 690, BUTANE-PROPANE *News*, 1709 W. 8th St., Los Angeles 14, California.

VETERAN, BEING RETIRED FROM ARMY, desires position with postwar future. Broad experience in field of management and sales for small electric and gas (LPG) utilities. Age 33. Prefer location in Mountain States or Pacific Northwest. Write Box 680 BUTANE-PROPANE NEWS, 1709 W. 8th St., Los Angeles 14, Calif.

BUSINESS OPPORTUNITIES WANTED

JUNIOR PARTNER OR MANAGER OF Buried Butane or Bottled Gas Business. Graduate Engineer, 33, six years experience sales, installations, operations; wholesale, commercial, utility, industrial. With Profits or Bonus must net $8,000 per year. Write Box 670, BUTANE-PROPANE *News*, 1709 W. 8th St., Los Angeles 14, California.

EQUIPMENT WANTED

WANTED: PROPANE, BUTANE OR 7-70 Cylinders, any size; cylinder valves; regulators; bulk tanks; truck tanks; pumps and controls, any size. Box 495, Syracuse, N. Y.

WANTED: PROPANE TANK TRUCK, around 1300 water capacity. Will trade 1941 Lincoln Zephyr; 4-door sedan; like new. Butane equipped. Mid-West Butane Company, P. O. Box 1292, Tulsa, Oklahoma.

EQUIPMENT FOR SALE

FOR SALE: TWIN TRANSPORT. 1647 water capacity each. Freuhauf 1941 Trailer 404-1944 G M C Tractor. Practically new. East Alabama Gas Co., Roanoke, Alabama.

FOR SALE AT CEILING PRICE. TWO 1[illegible] Fruehauf Butane Semi-trailer tanks. Working pressure 125 lbs. 150 lbs. gauges. 3465 w[illegible] gallonage. Tire size 10.00x20.—Two 1942 [illegible] eral Tractors Model 29K. Front tires 9.00x[illegible] rear tires 10.00x20.—One 1944 Fruehauf Butane Semi-trailer tank, working pressure 125 [illegible] 150 lbs. gauges. 4580 water gallonage. T[illegible] size 11.00x20.—One 1944 International tract[illegible] KR-11. Size of tires 11.00x20. Will sell tan[illegible] separately but tractors only with tanks. Mel[illegible] Transport Co., H. B. Bryan, Manager, [illegible] Greeley Building, Greeley, Colorado.

FREE TO WAR VETERANS

If you are a veteran of World War No. 2, you may run a "Situation Wanted" classified ad in this column three consecutive months without charge.

Send in your copy!

heater reaches 70°, No. 6 stat clos[illegible] one stage of the valve. If the tem[illegible] perature passes 80°, then No. 7 st[illegible] closes the second stage of the valv[illegible] As the air cools, No. 7 opens a[illegible] finally No. 6 if the temperature co[illegible] tinues to drop.

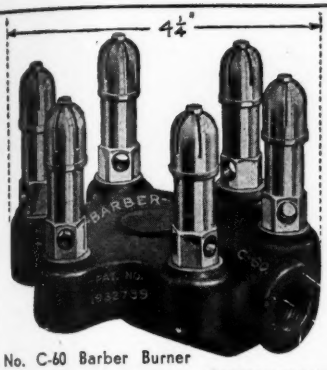
"If conditions arise whereby [illegible] constantly maintained air temper[illegible] ture of 80° heats the room to 78° [illegible] the limit thermostat will drop out N[illegible] 7 stat; and if the air cools to 7[illegible] then No. 6 stat will take control [illegible] the air temperature.

"If the room temperature dro[illegible] below 75°, the room thermostat w[illegible] pick up No. 3, 4, and 5 gas valv[illegible] through relay. All controls are wi[illegible] through the limit control of ea[illegible] unit. After the thermostat is sat[illegible] fied, the gas valves close and the N[illegible] 6 and 7 stats again have control [illegible] the air going into the brooding ro[illegible]

"Each heater has a manual by-p[illegible] in event of a gas valve failure.

"If the room temperature sho[illegible] drop below 70° F., a cooling ther[illegible] stat mounted next to the heat[illegible] thermostat, sets off a signal horn[illegible] the outside of the building.

"The system outlined was used [illegible] the first time last heating season [illegible] proved very satisfactory."



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Grand Home Appliance Co..... 3

Harper-Wyman Co. 16, 17
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Kalamazoo Stove Co..... 11
Kerotest Manufacturing Co..... —
Lancaster Iron Works, Inc..... 72
Lindemann, A. J., & Hoverson Co..... 53
Liquid Gas Equipment Corp.....123

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McNamar Boiler & Tank Co.....118
Merco Nordstrom Valve Co..... —
Milwaukee Gas Specialty Co..... —
Mission Water Heater Co.....117
Mosher Steel Co.....109

Neptune Meter Co..... 60

Ohio Foundry & Manufacturing Co., The 123
Oxford Co., The.....121

Pacific Gas Corp.....Fourth Cover
Parkhill-Wade ..... —
Payne Furnace Co.....105
Peerless Manufacturing Co..... —
Phillips Petroleum Co.....Third Cover
Pitman & Sons Sales Corp., J. C.....127
Pittsburgh Equitable Meter Co..... —
Pressed Steel Tank Co.....Second Cover

Radiator Specialty Co..... 89
Ransome Transportation Co., The..... 79
Reliance Regulator Corp..... 63
Reznor Manufacturing Co.....111
Rheem Manufacturing Co..... 49
Robertshaw Thermostat Co.....121
Rochester Manufacturing Co., Inc..... 78
Roney, Inc., L. C..... 60
Roper Corp., Geo. D. (Pumps).....101
Roper Corp., Geo. D. (Ranges)..... 47
Rose & Co., Inc., J.....123
Round Oak Co.....
Ruud Manufacturing Co..... 64

Savary Equipment Co..... 93
Scaife Co. .....Front Cover
Schoenberger Co., The W. J..... 6
Servel, Inc. 83
Sinclair Prairie Oil Co.....108
Smith Meter Co..... —
Smith Precision Products Co..... 97
Southern Gas & Equipment Co.....127
Sprague Meter Co., The..... 95
Standard Gas Equipment Corp..... —
Standard Oil Co. of California.....124
Superior Tank & Construction Co.....119
Superior Valve & Fittings Co..... 58

Tappan Stove Co., The.....4, 5
Tennessee Enamel Manufacturing Co... 81
Thomas Truck and Caster Co.....109

United States Heater Co.....120

Viking Pump Co.....122

Ward Heater Co..... —
Warren Petroleum Corp. 1
Weatherhead Co., The..... 10
Welbilt Stove Co., Inc..... 66
Whitehead Metal Products Co..... 84
Wilcolator Co. 57